COAL AGE

McGRAW-HILL COMPANY, INC.
JAMES H. McGRAW, *President*
E. J. MEHREN, *Vice-President*

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

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"Safety at Last"

"SAFETY FIRST" has been bandied about for years without much result, at least at coal mines. "Safety at Last" might be a better description of our hope. Surely we have made little enough progress in the last decade or so. Now the Phelps Dodge Corporation with steeds thrice stolen is endeavoring to see if there is not somewhere a lock that will secure the stable door. With water, steam, adobe and rockdust, with shelving, gunite and projected dust, with sprayed undercutters and cars not loaded above the sides, surely the projected "Safety at Last" will be attained and none too soon.

It is fair to say that in no industry, save a few smaller ones like powder manufacture, is safety less readily attainable. The road to safety in coal mining is long and devious, we cannot start on our way too soon. Even as we write the Benwood mine disaster assures us that the journey to "Safety at Last" is almost as long as ever, though legislation in favor of rock dusting may be like an automobile lift on the weary road.

How Not to Avoid Taxes

OPERATORS having idle lands are disposed to operate them so as to make them earn something with which to pay their taxes. In many instances that is an ill considered action. The taxes have to be paid in any event. Why not let one area pay the taxes on another? The area worked can be made more efficient, forces will not be divided, and in the end, larger profits will be made. If a mine is opened in another county or township the taxes in that political subdivision will be increased with advancing prosperity and as a result, the total taxes paid in the long run may be higher rather than lower.

Unfortunately one's nature rebels against paying taxes indefinitely on an undeveloped, non-earning property, and the decision is made to develop it so as to make it pay its way—and perhaps something more. But this is a tendency to be resisted till the first territory is being operated at maximum efficiency and at such speed as to assure that the coal will be exhausted within the economic life of the surface buildings.

Twenty years from now better mining methods will have been discovered, and the mine opened now to meet the taxes will not be suited to the methods of that day. The only advantage of a new mine is a shorter haulage underground. The new mine will require less equipment than the old one, but just as much additional equipment in the old mine will provide the development that the new mine would supply.

A new mine absorbs all the enthusiasm that should fall to the old one, and the old operation becomes neglected. It is best to curb that psychological desire to open up acreages just because they are a steady drain on income, for they may drain still more heavily when opened. Unfortunately, managers often are required to do not what is right but what is urged on them by impatient directors, who argue "Why did we buy if not to use what we bought?"

Union and Non-Union Territory

WITH few exceptions, union mines are in sections of the country having diversified industries, non-union mines being in areas where the coal and perhaps the lumber industries are the sole commercial activities. Difference of opinion will be expressed as to why this is so. Some will say that unionism cannot flourish where there are no other industries to which union men can escape when a strike comes and that where coal is the only industry the stores are not sufficiently financed or are owned by the coal companies. In the one case the merchant cannot support the idle union men and in the other case he will not. In that event the union men, who cannot get work during a suspension, cannot get supplies either and strikes fail.

Others will say that the age of the coal territory determines the degree of organized action of the employees and others again that coal-producing territory which has had many years of life develops capitalists who can invest in other industries and so has these activities as well as coal mining. Eventually they add, all territories which produce coal will be union and will produce other merchandise than coal.

Cause and effect are often difficult to separate and so much depends on leadership and solidarity among operators and mine workers that the social forces do not follow any law blindly. Wyoming, for instance, as far as the coal-mining regions are concerned, is a one-industry state, though cattle raising and sheep farming dispute this generalization. It is, however, neither old nor non-union. Maryland is old and has some local industries, yet it is largely non-union though it has many union adherents. Alabama has varied industries but is non-union.

With such exceptions in mind, however, it is nevertheless possible to state broadly that union areas have diversified industries, with farming as one of the more important of them, whereas non-union areas produce nothing but coal. In consequence, in times of a poor coal market men in non-union fields are not stimulated to discontent by higher wages or steadier work in industries competing for their labor. In fact if they left the mines their wages would be immensely lowered and work would be hard to obtain, whereas near union mines if wages were lowered it would be possible to get other work; and hence wages, regardless of the union, would have to be relatively higher than those in undeveloped or purely coal regions.

It is for this reason, or should it be these reasons, the non-union mines can lower wages to a figure to which the union mines could not lower them were there no union with which they had to deal. The non-union areas have naturally a low wage scale and can have it without any great discontent. The union areas have inevitably a high wage scale and must maintain some such scale or lose their men. This has proved to be a fact time and time again. The non-union fields have repeatedly lowered wages to a level to which the union fields could not have lowered them even if the union had not existed.

Miners are fairly mobile, but most of them merely move from one camp to another nearby. They rarely change from field to field. They are more mobile than in Europe, especially foreigners, but they do not leave one field for another readily. The cost and the uncertainties involved in moving make them "flit" rather than "fly," "move" rather than "migrate." Consequently wages will continue to be determined by local competition for labor rather than by national or international competition except where a strong union interposes to compel something resembling a uniformity of remuneration per unit of effort.

Too Many Grocery Stores

FOR many years the public has been cognizant of the fact that there were too many small retailers, men who made but little profit and used the labor of too many men, who scurried around for a little business that a few men could have handled had there been fewer establishments in the business.

That condition is duplicated at our bituminous mines. We should have fewer and better mining plants. The staffs at a number of mines should be concentrated on but half the number and every effort should be made to make these effective units instead of the limp organizations they too often are. The equipment in each mine should be the last word in effectiveness and efficiency, and no company can afford to make a general rejuvenation of all its properties at one time.

The wagon mine is not the only operation being eliminated; there should be many more mines than these laid idle, many of them of larger capacity, some of them perhaps efficient enough in their way as standards in the past have run, but not needed by the corporation that is operating them.

There are two reasons for closing down excess mines. One is that a mine working only a few days in the month does not produce cheap coal. One working only eleven days, for instance, finds its production cost raised almost 25 per cent. Working only seven and a half days, the cost of production is raised about 50 per cent. Another reason is that, as most companies can afford to equip well only a few mines with mechanical loaders and conveyors and all the proper equipment for safe, efficient and up-to-date operation such as will give reductions of almost 50 per cent in operating cost, it is better to close down a few mines and transform the rest. The latter will amply take care of the larger tonnage which low-cost production will afford, for reconstructed they will produce as much as the many mines now or formerly being operated.

We cannot afford to have mines working as listlessly and inefficiently as grocery stores.

Getting Down to Real Business

AT LAST there appears to be some hope that the manufacturers supplying the mining industry will adopt a one-price policy. Retail buying, especially of staples, has long been standardized, but when it comes to contracts for large quantities or big units, price-trading and bargaining is the indoor sport of the day.

In some sections of the field the practice of bargaining and price-cutting has become so bad that it is markedly uneconomic and unfair. Frequently the manufacturer submits his bid at a price much higher than that at which he expects to make a sale, and most of his agents' time is spent trying to find out, by any means possible, how much the original price must be shaded to get the contract. It is not unusual for many manufacturers' representatives to hang up at an expensive hotel for a week or more waiting an opportunity to get the inside track on the price. It is easy to see how an overzealous sales representative may reduce his price, on a wild tip, to a point where the manufacturer must sell at a loss.

The purchaser often sacrifices most when he thinks he has gained most. Brow-beating and delay sometimes make it possible for the purchasing agent to place an order at a price perhaps a thousand dollars or more under the first figures. But how does this react when the manufacturer realizes he can make no profit at the figure accepted? Does he not lower the quality of his product, let a defective part go into the order, refrain from sending along with the equipment the construction engineer who he intended should aid in its installation, omit important accessories which he would ordinarily supply?

How easy it is for the manufacturer and particularly a jobber to make up his loss on the sale of the original equipment by putting a high price on the repair parts, which generally do not receive the personal attention of the purchasing agent.

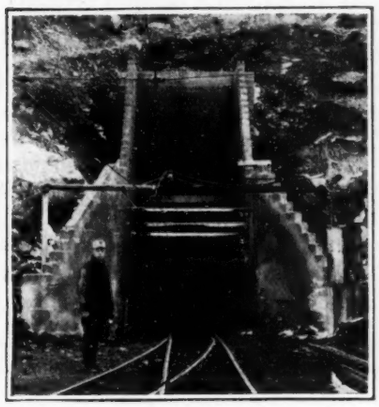
Then too, the purchaser must consider the demoralizing effect upon the engineering personnel when they find that they have recommended the purchase of one company's product and received that of another because the purchasing agent has been able to get a better price from another bidder. The losses occasioned by such last-minute changes after the engineering department has designed a layout and bought most of the material to fit in with the equipment recommended, are rarely less than the savings in first cost effected by the purchasing department.

Both manufacturers and coal companies will have to display considerable courage to minimize such economic crimes. The salesman's attitude must be changed and the purchasing agent will have to be made to feel he can serve best when he can confidently place his orders for good materials at a reasonable profit to the seller.

THE PRESIDENT OF A COMPANY is the court of last resort, the man who decides the big issues. Seldom are these men competent to make such decisions. Quite often they are lawyers, physicians, coal jobbers, traffic men—anything but engineers. Thus they need an exposition to clarify their ideas, and they will go to Cincinnati. But some are engineers themselves, you will say. But why speak of them? They will be there of volition as much as from a sense of duty.

Minimizing and Localizing Coal-Mine Explosions

Haulage Roads Adobe Dusted, Manways Rock Dusted —Dust Barriers Placed at Strategic Points—Air Heated by Radiators and Humidified by Steam and Water —Undercutter Chains and Loaded Cars Sprayed



By W. C. Holman
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THE many coal mine disasters occurring during the past year have given impetus to, and aroused increased activity in, the study of ways and means for the promotion of mine safety. In the West particular interest has centered in the methods available of minimizing and localizing gas and dust explosions. At the present time much attention is focused on the experimental work being conducted at the Dawson coal properties of the Phelps-Dodge Corporation.

Through the co-operation of the management, the foremen and individual employees, much already has been accomplished. Officials of this company are always on the alert for new methods, continually conducting experiments, improving existing practice and rigidly enforcing safety rules, all of which tend to improve working conditions and to stimulate interest in safety.

In order to lessen the possibility of an explosion, as well as to dampen or arrest its propagation should it once start, "adobe" dust has been spread several inches deep on the main haulage roads throughout all mines. In each operation the main haulage is the intake aircourse, and the disturbance caused by moving trips is sufficient to stir up this dust, whereupon the ventilating current carries it appreciable distances, depositing it upon ribs, roof, timbers and the like. Such inert dust deposits would undoubtedly tend to prevent the propagation of an explosion, no matter in what part of the mine it might initiate.

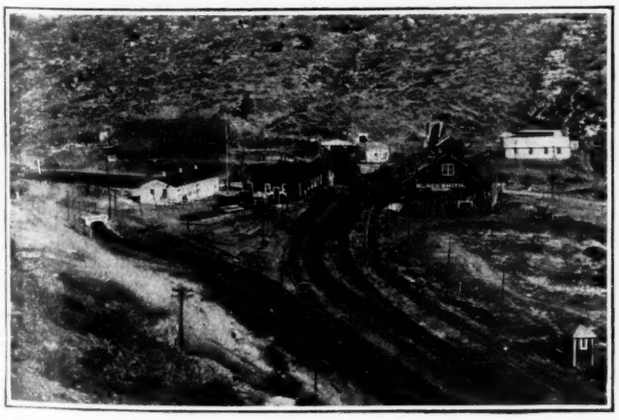

Fig. 1—General View of Surface

Openings to mines Nos. 1, 3 and 6 may be seen in this picture, also blacksmith shop, motor barn, fan house, mule stable, check cabin, lamp house and other structures.

Samples of dust from floors, ribs, roof and timbers are taken regularly each month and analyzed by the local chemist. A combined sample taken from all the mines ordinarily will show 85 per cent of incombustible matter or ash.

All motor roads that are treated with this adobe dust are continually raked and cleaned, one man in each mine being employed for that express purpose. He separates the coal and rock from the dust, piling them along the entry. These piles are removed about every two weeks. The dust itself is renewed from time to time as may be required, the length of these intervals depending much upon the ash content as shown by the report of the chemist. Loaders are not allowed to heap coal to any appreciable height above the sides of the mine cars. This is done primarily to prevent the scattering of broken coal along the haulage roads and also to avoid waste.

Use Rock Dust with Cement Gun

Experiments are now being conducted in the manways of the various mines on the use of rock dust as a preventive of the spread of explosions. Quartzite or other metamorphic rock is crushed to pass a 200-mesh sieve, then thoroughly dried and sprayed into the aircourse by means of a cement gun. By this method the floors, ribs and roofs of the entries are coated with this inert material. Rock dusting appears to be more economical than adobe dusting in return air courses and in such intake courses as are not used as main motor roads.

The use of adobe and rock dust on intake aircourses in all mines is now considered standard practice by this company. Beyond doubt it forms an effective safety measure for minimizing and localizing possible explosions. A scheme for coating the ribs and roof of all motor roads with adobe mud is also being tried. This is sprayed into place by means of a cement gun. The gun is mounted on a special truck, to which is attached a compressor and water tank as well as cars containing the adobe and all necessary accessories. The entire train thus formed is drawn through the mine by an independent electric locomotive.

In order to reduce the possibility of an explosion still further batteries of V-shaped troughs forming dust barriers have been installed at strategic points on the main entries and air courses and at all intersections of cross entries with main entries both on the haulage roads and return aircourses. A battery con-

sists of sixteen V-shaped troughs each from 10 to 20 ft. in length depending upon the width of the entry in which they are installed. These troughs are made from 1x8 in. boards and are supported near the roof of the entry on 2x6 in. stringers. They are filled with dry shale or rock dust which will average about 95 per cent ash. This dust is periodically tested and is renewed whenever it becomes too damp or too greatly contaminated.

At present the number of dust batteries installed in the various mines is as recorded in Table I.

Table I—Batteries in Phelps-Dodge Corporation Coal Mines

Mine. No.	Batteries	Mine. No.	Batteries
1	17	6	32
2	21	8	17
3	27	9	20
5	12		

Five automatic water barriers have also been installed on the main haulage road of Mine No. 5. Each of these consists of four ¾-in. automatic water sprays discharging within a space of about 10 ft.

As an experiment in humidification of the mine atmosphere, live steam is conducted into the main motor road of Mine No. 5 for a distance of 700 ft. Here it is forced through radiator coils from which it is discharged by ⅜-in. steam jets into the air current. A 200-hp. boiler, installed near the mine portal, generates steam at a pressure of about 13 lb. gage. From the boiler it is conducted into the mine through a 3-in. main to eighteen of these radiators, each of which is made up of 1½-in. pipe in the form of an L, 10 ft. on the long side and 5 ft. on the short side, with a 2-in. junction pipe on each end. Each radiator is fitted with two ⅜-in. steam jets which, together with five ½-in. jets on the main line, discharge steam into the air current.

In connection with this humidifier a ¾-in. automatic spray has been installed about 300 ft. beyond the radiator. This raises the humidity of the air slightly more than 10 per cent at this point.

Tests conducted throughout the mine showed a minimum humidity of 95 per cent at a temperature of 60 deg. F. during the month of January, 1924. The humidification system installed in this mine is in addition to the trip sprays later described and the dust barriers already mentioned.

The cement gun is being used to cover the ribs, roof and timbers on the main motor road in all mines with a thick coating of gunite mixed in the proportion of one part cement to four parts of sand. When gunited all cracks and crevices are filled and the ribs present a far smoother surface than before, thus reducing the friction offered to the air current. No ledges or shelves protrude upon which inflammable dust may accumulate. Furthermore, the entries are lighter and more sanitary than before.

In all main entries 3-in. pipe is carried to within a few hundred feet of the advancing face. In tunnel entries 1½-in. pipe is used up to within 50 ft. of the face. These lines are provided with suitable connections every 100 ft. to premit of a hose being attached for sprinkling purposes.

In all rooms ¾-in. pipe is laid to within 20 ft. of the face, and 20 ft. of rubber hose is furnished to enable the miner or loader to sprinkle the coal before loading it into mine cars. The loader not only sprinkles the loose coal but is required to wet down the surrounding ribs and gob thoroughly for a distance of 50 ft. from the face. Regular sprinklers are employed to keep all mule-haulage roads and secondary aircourses in a safe condition.

To each mining machine a ¾-in. pipe is attached. This is reduced at the end and bent downward so as to allow water to flow on the feed side of the cutter chain, this pipe being connected to the water line by a 50-ft. hose. Thus while the machine is in operation water is discharged under the cut, saturating the coal dust as rapidly as it is made. The use of this device allays all coal dust produced in the undermining of the coal.

Mine Cars Are Drenched With Sprays

Moreover, all loaded car trips are drenched by sprays before leaving their respective districts, and this process is repeated on the main partings. These sprays are made from 1½-in. pipe bent to form a loop about 36 in. in diameter and perforated with ¼-in. holes. Water is sprayed from them in such volume that each car receives about 15 lb. in passing. Water for operat-

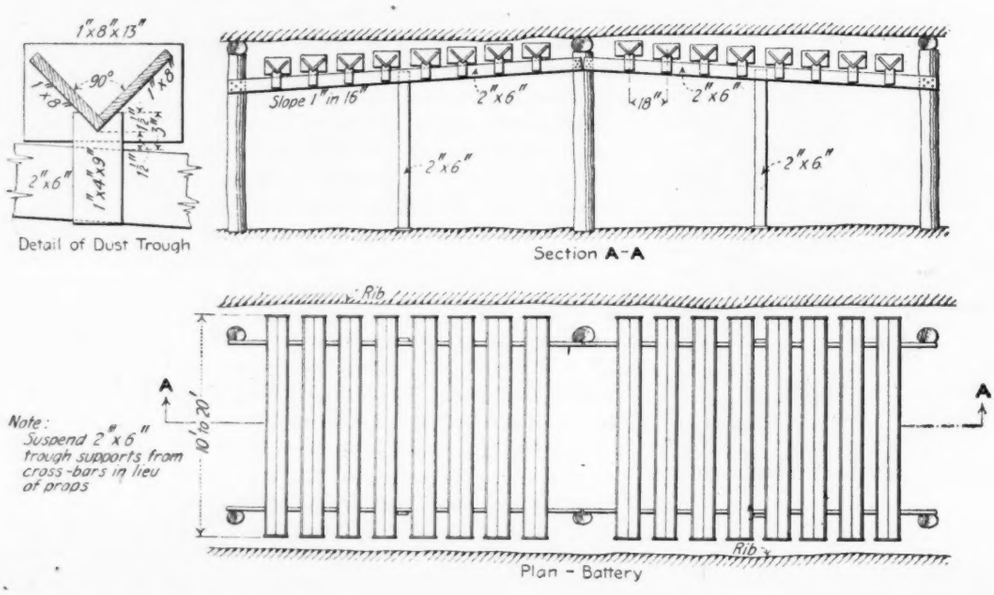

FIG. 2

A Dust Barrier

Fine stone dust is placed in the troughs which are supported near the roof of the heading in such a way that the force of an explosion even though comparatively incipient will upset them. The dust will therefore fall in a series of sheets extending across the heading effectively damping and extinguishing the explosion flame.

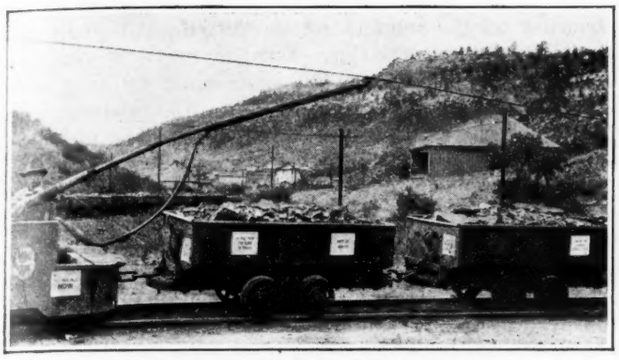

Fig. 3—The So-Called Silent Foreman

Oft-repeated reminders of possible danger do much to render men careful. They are most effective when given by word of mouth, but the next best thing is to make them visual. Posters, each carrying a warning of danger or admonition to be careful are here shown pasted to the sides of locomotive and mine cars.

ing the sprays and for sprinkling is pumped from the mine workings either directly to the main or into elevated tanks placed at such points on the surface as to secure a gravity head. The height at which these tanks are installed is determined by the pressure necessary. They are always kept full so that they may furnish water for sprinkling requirements in case of trouble with the pumps. Connections are also maintained with the city water mains.

The number of trip sprays maintained in the mines at the present time is recorded in Table II.

Table II—Sprays in Phelps-Dodge Corporation Mines

Mine No.	Sprays	Mine No.	Sprays
1	6	6	7
2	7	8	3
3	11	9	5
5	9		

In these mines the electric arcs caused by the usual type of trolley locomotives are regarded as a possible source of danger. Consequently storage-battery locomotives are now being installed experimentally. This installation will comprise 15-ton storage-battery machines so designed that they may be operated either singly or in tandem. The standard battery unit will be of 80 cells mounted on a four-wheel truck. When operated in tandem two of these units will constitute a single locomotive. This will be 16 ft. 6 in. long, 57 in. high and 68 in. wide, these being approximately the dimensions of the heavy locomotives now being used for main haulage. The charge in each unit will be freshened every time the machine reaches the outside which on an average will be once and hour. During the night the locomotive batteries will be completely charged.

Mining machines likewise will be equipped with 29-plate, 88-cell batteries carried on trucks especially designed to meet the requiremtns of the underground workings. By these means the ordinary electric sparks and arcs caused by the trolleys will be entirely eliminated.

At all mines double-inlet reversible fans are employed for ventilation purposes. These normally operate exhausting. Mine No. 5 is fitted also with an auxiliary fan. All these mine fans are operated on 220-volt current except those at Mines Nos. 1, 2 and 5, which are run on 2,200-volt circuits. In every instance a separate line supplies power to the fan.

The various mine offices, motor barns, lamp houses, etc., are connected to the fan houses by an alarm system. This is intended to give warning in case of trouble with the fan motors. The largest fans in operation are those located at Mines Nos. 2 and 3. These are 18x6ft. machines rated to deliver 400,000 cu.ft. of air per minute against a 5-in. water gage, when operated at 150 r.p.m. Each normally consumes about 420 hp. Periodic tests are made of the power consumption and air delivery of these fans. When necessary, changes are made in their operation to assure that the required quantity of air is supplied to the mines.

One highly important detail of the ventilating system is the provision that air passing through worked-out or gobbed areas is not allowed to circulate through working places but is returned direct to the main aircourse. It is the practice to wall off as rapidly as possible all caved and abandoned workings. Concrete or cement blocks made of coke breeze are used for all permanent stoppings. Explosion doors are constructed at all fan houses to guard against injury to these machines.

Much Attention Given to First Aid

It has been truthfully asserted that the most efficient safety device possible is a careful man. In order, therefore, to promote care and discourage carelessness on the part of every one, instruction in first aid has become one of the most interesting and important activities connected with the safety program of the Dawson mines. Every possible effort is being made to extend first-aid training.

In order to obtain maximum efficiency, classes have

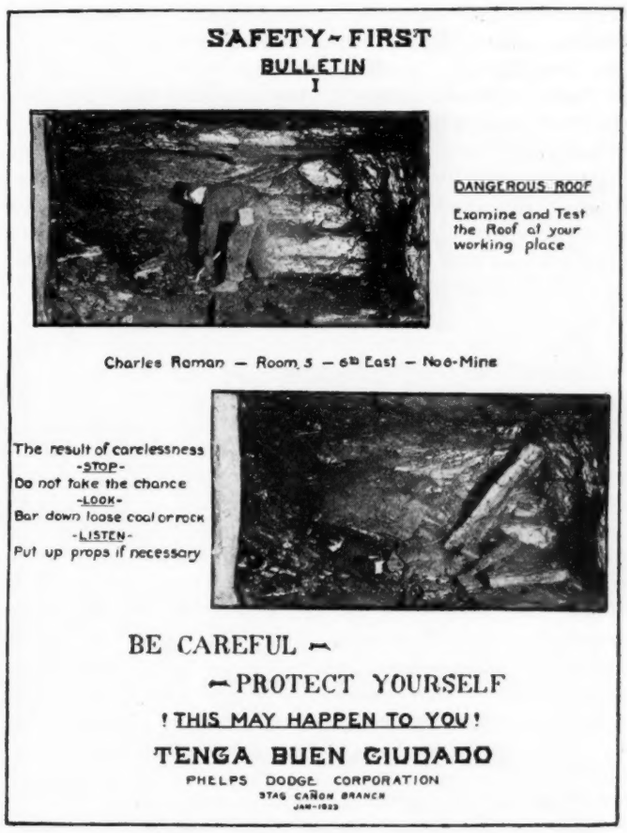

Fig. 4—A Typical Safety Bulletin

After an accident an investigation is made and its cause determined. The accident is then reenacted and various pictures taken. These photographs form the nucleus of an effective safety bulletin. The one here illustrated is typical and shows "how Charlie Roman got his."

been organized among the several nationalities employed in these workings and residing in the various sections of the camps adjacent to the mines. These classes are in charge of competent, trained, local instructors assisted by interpreters. The course of instruction is covered in ten lessons of two hours each after which an examination is held and a certificate awarded to those showing the necessary proficiency.

Between Nov. 1, 1923 and March 1, 1924, 950 men, 33 women, 25 boy scouts and 80 school children completed the first-aid training as prescribed by the United States Government and passed the examination given by the officials in charge of Bureau of Mines Rescue Car No. 2.

Safety bulletins also are prepared from time to time by the engineering department and distributed about the works. Causes for the common types of serious accidents are studied, and photographs made at the working places, the subjects used being well-known employees. This lends local color to these bulletins (which usually takes the form of blue prints with photographs mounted thereon) and makes them highly interesting to the miners. They are eagerly studied when posted in conspicuous places such as the lamp house and check cabin.

All accidents are reported by the foremen, such reports giving the cause of the mishap and suggestions for the prevention of similar occurrences in future. These reports are filed for future reference and study. When fatal accidents occur, safety inspectors visit the scene and make a detailed study of all the conditions there existing. From the report then made a sketch is drawn by the engineering department showing the working place, the accident and its cause. Prints of this drawing are embodied in the report which must be made to headquarters. They are also used for the study of ways and means for the prevention of other serious accidents of a similar nature.

Posters executed in various colors are pasted on the sides of pit cars or locomotives and covered with a coat of white shellac. Some of the inscriptions used upon these posters are as follows: "Set that prop now," "Be careful of your eyes," "Take down that loose roof," "Don't let machine jack slip." These serve to admonish those who see them that they need to be constantly on the alert for dangerous conditions or practices.

Foremen's Meetings Produce Good Results

In addition to all of these precautions, semimonthly meetings for all underground foremen and assistant foremen are held regularly. At these "get togethers" various subjects are discussed including the general conditions of the mines, the improvements of existing rules, the formulation of new regulations, the causes and results of accidents and the hazards expressed by accident records. Improvement of working places and many other interesting topics are also considered. At certain specified times, usually three times each year, the underground foremen meet in joint session with those employed on the surface. All are interested in safety and first-aid work, and these meetings are usually of a highly instructive character.

Some of the more or less general rules which have already been formulated and are now followed are:

Not more than 1½ lb. of permissible powder may be placed in any one hole. Adobe dust is furnished at all working places and must be used for tamping holes. Shooting off the solid is not permitted. All coal must be undercut and the bug dust or cuttings removed before it is shot down. All shots must be fired electrically, connections being made to the underground feeder lines by the shotfirers, who are required to report outside before the rounds may be fired.

Other rules are: All missed holes must be reported to the fireboss who temporarily suspends work at that particular place until conditions are made safe. Miners have nothing whatever to do with the use of either powder or caps. Only magnetically locked safety lamps approved by the Bureau of Mines may be used and these are in the hands of foremen, firebosses and shotfirers who have been thoroughly instructed in their use. Open lights are strictly forbidden in underground workings. All employees are searched frequently and without previous warning for matches or other smoking materials. Any found guilty of violating this fundamental safety rule against carrying such materials into the mine are liable to immediate discharge.

"Rome was not built in a day," and genuine mine safety cannot be attained overnight. For its accomplishment is needed time and unremitting application. This is the end kept constantly in view by the owners of the Dawson mines who are attempting to foster care and caution by all known means. Unquestionably much has already been accomplished, but continuous effort on the part of all hands along the lines above described should yield even greater results in the future.

Raton Coal Equal to That from Ohio

ONE of the most valuable coal deposits in the western states in quantity, quality, and accessibility of the coal is that of the Raton coal field, in Colfax County, N. M., situated in what is known as the Raton Mesa region, of Colorado and New Mexico, an area that measures about 90 miles from north to south, and 50 miles from east to west.

The bituminous coal in this region, which occurs in two series of beds, compares favorably in quality with the best bituminous coal of Ohio. Much of the coal of the lower series will coke, and at many places this coal occurs in thick beds that are easily mined. Coal has been mined in the Raton field on a commercial scale since the early seventies. The first large mines, which were near Blossburg, were operated for many years but were finally abandoned, as coal could be mined to better advantage at Koehler, Van Houten, and Dawson. Extensive mines have been opened recently at Brilliant, Gardiner, Sugarite, and Swastika. During the 10 years from 1911 to 1920 the Raton field yielded more than 27 million tons of coal.

Though the coals of this region are among the best in the West, their quality differs greatly from place to place. Most of the coal beds of the Raton field are relatively thick, contain excellent coal, lie almost horizontal and are not much faulted, but at some places the coal has been coked or completely burned out by intruded igneous rocks.

A description of the southern part of the Raton Mesa region, with maps, is given in Geologic Folio 214, issued by the Geological Survey, Department of the Interior, and the geologic structure of the coal-bearing beds of the Raton field is described in detail in the Geological Survey's Bulletin 752, Coal resources of the Raton coal field, Colfax Co., New Mex., just issued.

Survey Shows Big Percentage of Illinois Mines Generate Their Own Electric Energy

Steam Is Universally Generated—Return-Tubular Boilers Predominate—Steam Engines Popular but Several Plants Have High-Pressure Turbines—Seventy-Eight Per Cent of Mines Operate Private Power Plants

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Inasmuch as Illinois is one of the largest of coal-producing states, the equipment at its mines probably is fairly representative of American coal-mining practice. Consequently, data I have collected showing what types and sizes of boilers, engines, turbines, direct- and alternating-current generators are used at many of these mines to supply power to both steam- and electrically-driven machinery will exhibit the general trend of power generation and supply at the mines of this country. We are at a period in all mechanical industries when efforts are continually being made to improve the efficiency of power generation and of power consumption. Many coal operators are not progressive, but some are outstanding in these matters and may be said actually to pioneer in their method of solving power problems. Many high- and mixed-pressure steam turbines recently have been introduced at Illinois mines. A few magnificent electric power-generating plants have been erected by coal companies, and these contain all the refinements of operation to be found in up-to-date public-utility plants.

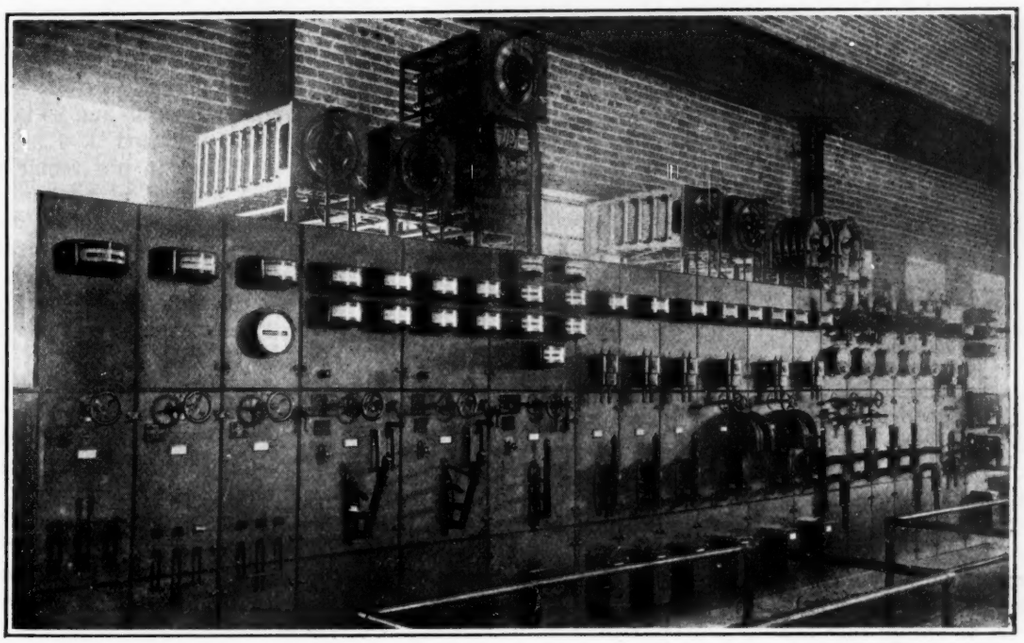
The economic conditions in the coal industry are discouraging to many coal men and it is likely that most of the old mines will continue till they are finished with their present power units or with renewals of the same types. Operators of new mines, however, will equip their plants with more-or-less standardized apparatus. The data regarding Illinois coal mines which follow are restricted to shaft operations because such mines are far more numerous than slope and open mines and their power requirements are always greater.

Steam is generated at all Illinois mines, even where none is used to drive machinery—as at the few wholly-electrified mines. When steam is not maintained in readiness to run hoisting engines, fan engines, tipple engines or pumps, or for emergencies at such mines, small quantities are nearly always required for heating buildings and to supply water for wash-houses. The steam requirements greatly vary and are largest for big companies operating plants that generate electrical power for distribution to groups of mines owned by one company.

Consequently, it is to be expected that boiler equipments will vary widely in capacity, type and efficiency. The return-tubular type predominates, it being used exclusively at about 78 per cent of the mines. At 8 per cent of the other mines it is supplemented by other types. At these mines there are, on the average, nearly six—actually 5.8—return-tubular boilers per mine, each of an average rated capacity of 145.5 hp.

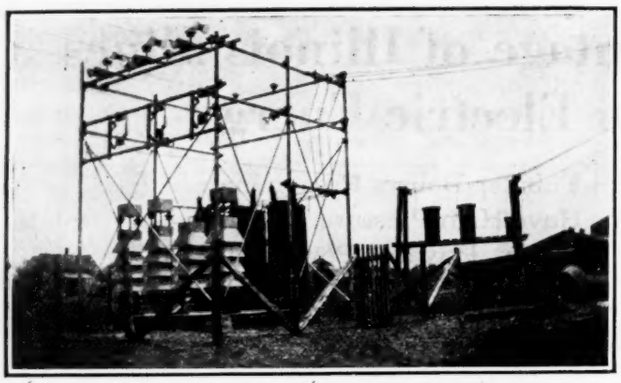
At 14 per cent of the mines the boilers are exclusively of the water-tube type. Adding the 8 per cent at mines having mixed types, 22 per cent of the mines use water-tube units. These mines have as an average three such boilers each, their average capacity being 368.9 hp. per unit.

Illinois coal-mine operators utilize 7.6 times as many old-fashioned return-tubular boilers as modern water-



Switchboard for Steam-Turbine Plant

Many of the larger plants erected by coal companies have all the refinements found in up-to-date public-utility plants. Some plants use mixed-pressure steam turbines, getting the low-pressure steam from large hoisting engines.



High Voltage Transformer Substation Well Protected
From this bank of transformers power is distributed for the various operations in and about the mine. Choke coils and lightning arresters protect the transformers from any surges or other disturbances which may come over the power company lines.

tube boilers. Wherever water-tube units are in use, they have 2.7 times the capacity of the average fire-tube unit.

Interesting and varying opinions are entertained by Illinois operators regarding the value of the fuel they consume under their boilers. Some operators insist that their power fuel costs them nothing, it being grades of slack that command no market. Other operators carefully assess their power plants with their consumption of screenings or run-of-mine at the local current prices for these grades.

It is common practice at some mines to send to the boiler rooms any grades of coal that are not finding ready market. This occasionally results in the consumption at the plant of the better grades such as nut and lump. One operator frequently orders his lump coal sent to his boilers, his argument being that his lump costs him no more than does his slack. He thus takes direct issue with those men who claim that their fuel costs nothing.

Opinions on Power Costs Are Diverse

These diverse opinions are encountered when one endeavors to ascertain the relative costs of power generation at different mines. One superintendent will claim his power costs him nothing except the labor and a small item for supplies and upkeep, while a neighboring superintendent finds relief in accounting for a high coal-production cost by referring to his excessive power-generation expense which involves the combustion of good run-of-mine coal that has cost at least so-much per ton.

Where water-tube boilers are installed, automatic stokers are invariably used. They are employed also at a few plants under fire-tube units. About one-sixth of the boilers are thus fired.

For the generation of electric power at the mines the usual motive power unit is the steam engine. The variety of these units well illustrates the progress that has attended the building of stationary engines during the past forty years. Some of them are strikingly interesting because of their antique features. On the other hand, there are some fine high-speed, straight-line engines and several of the Corliss type. A few of these are compound engines and operate condensing.

At about 62 per cent of the mines, engines are used exclusively for driving the electric generators. The average plant includes two engines, and it is the practice to assign each engine to a separate dynamo. Eighty-five per cent of these engine-generator sets are direct-connected, 12 per cent are belted, the remaining few being either geared or rope-driven. The average generator capacity per unit is about 187 kw.

Steam turbines are used exclusively at only 4 per cent of the mines. These generally operate upon high-pressure steam. However, at one plant the power is derived from a mixture of live steam with the exhaust steam from a hoisting engine. The average capacity of a turbine and its built-in, alternating-current generator is a little more than 1,100 kva.

At about 12 per cent of the mines the generators are driven both by engines and turbines. Invariably the engines drive direct-current dynamos, turbines being used to drive alternators. At these mines the average capacities of these respective units are 177 kw. and 619 kva.

At the mines which generate all their electric power, which constitute 78 per cent of the entire number, the average generating capacity is 582 kw. Included in this summary are mines having all kinds of steam-driven generators. The average turbine has about 4¼ times the capacity of the average engine. The average alternator has a rated capacity about 3½ times that of the average direct-current dynamo.

As it is in a class by itself, the magnificent power plant of the Standard Oil Co., at Schoper, is not included in the above generalities. In this plant there are two turbines of 4,000 hp. and one of 2,000 hp., each driving its own generator. The gross capacity of the equipment is 6,250 kva.

Electricity is used at every mine. Its sole use may be for illumination—as at a few 'pick' mines—and, in such cases, it is generally purchased. Some mines both generate and purchase electric power for the major operations, thereby eliciting an interesting economic inquiry. In the case of a mine that outgrows its power-generating capacity, one can readily understand why the owner might decide to purchase the necessary additional power rather than increase his plant but, when we find instances in which progressive operators have closed down their wholly-adequate powerhouses and are operating upon purchased electric power, we face a paradox.

Of the accidents caused by explosions, 40 per cent occur in the actual use of explosives, 40 per cent in their transportation and 20 per cent from suffocation by their fumes, stated J. E. Crawshaw of the U. S. Bureau of Mines in his remarks on "Explosion Hazards in Coal Mining" at a recent safety conference held in Pittsburgh, Pa. In 1921 about 40,000,000 lb. of permissible explosives were used in coal mines, representing only 18 per cent of the total consumption of explosives for this purpose. About 12 per cent were high explosives and 70 per cent were black powders. The use of permissible explosives and approved electric blasting equipment must be increased if greater safety is to be attained. J. J. Walsh, secretary of mines of the State of Pennsylvania, remarked that one of the laws scheduled for consideration at the next session of the Pennsylvania Legislature would compel the use of permissible explosives and electric blasting equipment in the mines of the state. The measure as applied to the anthracite field failed to pass two years ago. From present indications state-wide adoption is now probable.

Much High-Grade Material in Inferior Coals Which Sand Flotation Can Release

Many Coals Can Be Converted Into a Metallurgical and a Steam Product, Both Readily Salable—A Rise of One Hundredth in Specific Gravity Equivalent to an Increase in Ash of One per Cent

By H. M. Chance
Consulting Mining Engineer,
Philadelphia, Pa.

OUR low-ash coals are not by any means exhausted and may be obtained from many, and not, as is the general impression, from a few districts or from a particular bed or beds in that district. What promises a far greater supply may be found hidden in beds of relatively poor quality.

Coal is not a homogeneous material. No two lumps of coal are exactly alike. The distribution of ash throughout a coal bed is generally erratic and uneven. Layers and masses of high-ash and low-ash coal exist more or less irregularly intermixed in most coal beds. As everyone knows beautiful specimens of pure coal obtained from coal beds of poor quality are frequently used in promoting the sale of a coal property.

The problem involved in separating this pure low-ash coal from the higher-ash coal with which it is intimately associated is not unlike that of separating an ore, such as lead or zinc, from the rock or gangue matrix containing it, except that in ores the great difference between the specific gravities of the particles of ore and of the gangue of rock make their separation relatively easy. On the other hand, the difference in specific gravity between low-ash and high-ash coal is so small that the concentrating methods effect the separation of these two grades only with difficulty.

Not Necessary to Crush All the Coal

The irregularity just mentioned, in the distribution of ash in coal, applies to coals of high grade as well as to impure coals. High-grade coals generally contain large percentages of phenomenally low-ash coal. The masses, layers or particles of such low-ash coal, however, may be of any shape or size; and a satisfactory separation generally can be effected without resorting to fine crushing of all the coal, the method that is so largely used in jigging coal for metallurgic coke-making. Low-ash and high-ash coal often are found together in lumps that to the eye appear to be of a uniform high grade.

The sand-flotation method of washing coal, by which an accurate separation of the coal into separate grades readily can be made, seems likely to add these widely distributed low-ash resources to our valuable low-ash reserves. The use of this flotation process depends on the following facts:

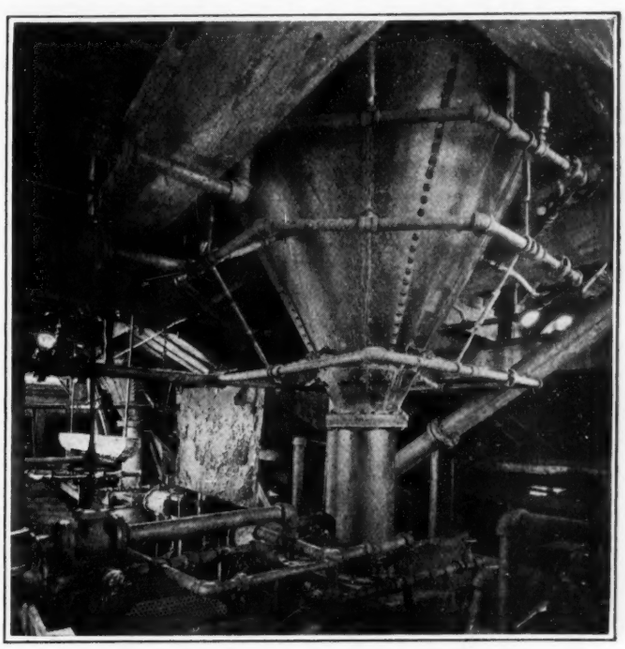
(1) The specific gravity of every piece of any particular coal depends on the percentage of ash in that particular piece, the specific gravity increasing almost uniformly about 0.01 for each per cent of ash. For example, if a coal with 3 per cent of ash has a specific gravity of 1.32, another piece of the same coal with 5 per cent of ash will have a specific gravity of 1.34; with 7 per cent of ash the specific gravity will be 1.36; with 10 per cent of ash it will be 1.39 and so on. Apparently there are few exceptions to this rule.

(2) The distribution of ash in coal is quite generally erratic. Coal not being a homogeneous material, low-ash and high-ash coal may exist irregularly mixed through a single lump, which may appear to the eye to be homogeneous and of uniform quality throughout.

(3) The sand-flotation method separates materials on the "float-and-sink" principle; that is to say, it floats all materials lighter than the specific gravity at which the separation is to be made and all heavier materials sink. It thus virtually weighs every piece, large or small, floating only those that do not exceed a specified specific gravity.

The sand-flotation method was fully described in *Coal Age*, May 4, 1922, and it is not necessary to give again the details of the process. The number of plants now using this method, in the anthracite region, has increased to six, another plant is now under construction and others are being designed.

Each of these plants is owned and operated by a different company. They are widely distributed and no two of them are operating on exactly the same kind



Tank in Which Coal Floats and Refuse Sinks

Coal is subjected to the float-and-sink test, but the liquid in which the test is made is not densified by the use of soluble salts but by particles of sand suspended by mechanical agitation. The material heavier than a given specific gravity is, as popular parlance would erroneously state it, "sucked into the quicksand and swallowed up by it." Eventually it is drawn out through a valve lock and sent to the refuse bin.

of coal. They have a combined capacity of more than 1,000,000 tons annually. These plants are used not merely for the differential separation of the coal into two or more grades, but more particularly for the removal of slate, rock, fireclay, pyrite and heavy bony coal.

Why Coal and Mineral Processes Differ

From the zinc-lead ore parallel, referred to previously as an illustration, it is evident that the separation of masses of low-ash from a high-ash matrix is a process similar to that applied to ore dressing. To free ore from its matrix the material must be crushed; if the ore masses are large, coarse crushing is first used to recover the large pieces of ore. Similarly, with the differential separation of low-ash coal, when the coal contains relatively large masses or lumps of low-ash coal this should be removed before the coal is crushed to smaller size.

Here, however, the parallel ends, because the problem is not one of separating a very heavy substance from a much lighter material, as is the case in ore dressing. In treating coal it is necessary to separate all material having a lower specific gravity than that specified from that having a higher.

This can be effected by the use of high-gravity liquids, or high-density solutions, such as are commonly used in laboratory or experimental tests, but cannot be used in work on a commercial scale.

Table I illustrates the close relationship of the specific gravity of coal and its ash percentage, and shows the possibility of making differential separations of a coal into grades of different character. The data given are taken from the records of a series of tests on No.-2 buckwheat (rice) coal, which unwashed contained 34 per cent of ash.

Separation at a specific gravity of 1.90 gave 68.35 per cent of coal (floated), containing 10.10 per cent of ash and 31.65 per cent of refuse (sunk), containing 85.30 per cent of ash.

The refuse therefore contained nothing that could be classed as coal. The washed coal, containing but 10.10 per cent of ash, has a relatively low-ash content and is a satisfactory fuel for steam-making and other purposes. It does not, however, consist simply of particles of coal containing 10 per cent of ash, but is a mixture of particles having a range, in the percentage of ash, from 1.88 up to 39.85 per cent, as shown in Table I.

Table I—Showing the Composite Character of Coal

Coal tested was buckwheat No. 2 coal carrying 10.10 per cent ash

Specific Gravity of Liquid		A	B	C	D
Less Than	More Than	Coal, per Cent	Coal, per Cent, Cumulative	Ash, per Cent	Ash, per Cent, Cumulative
1.90	1.84	2.44	100.00	39.85	10.10
1.84	1.80	2.25	97.56	34.07	9.35
1.80	1.76	1.64	95.31	30.68	8.76
1.76	1.73	1.96	93.67	26.54	8.38
1.73	1.70	3.25	91.71	22.89	7.99
1.70	1.68	2.05	88.46	18.58	7.47
1.68	1.66	1.64	86.41	16.12	7.18
1.66	1.64	0.48	84.77	12.63	7.01
1.64	1.63	5.34	84.29	18.16	6.98
1.63	1.61	9.54	78.95	11.43	6.22
1.61	1.59	9.54	69.41	9.02	5.50
1.59	1.57	11.44	59.87	7.05	4.95
1.57	1.55	24.79	48.43	5.27	4.45
1.55	1.53	21.36	23.64	3.29	3.58
1.53	1.49	0.57	2.28	1.88	6.34
1.49	....	1.71	1.71	7.82	7.82
		100.00			

The analyses in Table I were made by George C. Davis, chemist, Philadelphia, Pa. If this coal is subjected to differential separation at specific gravities of 1.59, 1.57 and 1.55, respectively, the character of the two products yielded will be, approximately, as in Table II.

Table II—Showing Float-and-Sink Results

Specific Gravity of Liquid	Coal Floated, Per Cent	Ash, Per Cent	Coal Sunk, Per Cent	Ash, Per Cent
1.59	59.87	4.95	40.13	17.77
1.57	48.43	4.45	51.57	15.39
1.55	23.64	3.58	76.36	12.11

Outcrop Coal May Be Light but Ashy

Table I shows two apparent failures to follow the rule as to the relation of specific gravity to percentage of ash. The observed variations between gravities of 1.63 and 1.64 and results adjoining (Column C) was caused by the substitution of a new hydrometer, after breaking the one used in making the previous tests. Before the difference was discovered and adjusted, high-ash matter, which should have been distributed through the material separated at 1.66 and 1.68 gravities, was thrown into that separated at 1.64 gravity, thus increasing both the percentage of ash and the quantity separated at that gravity and reducing these items in the material separated at 1.66 and 1.68 gravities.

The other instance of variation from the rule appears in the separation obtained at 1.49 gravity, in which coal *lighter* than that separated at 1.53 showing 1.88 of ash, shows an exceedingly high-ash percentage of 7.82. This latter discordance is caused by the presence, in the coal tested, of a small quantity (1.71 per cent) of outcrop coal. This outcrop coal, though carrying 7.82 per cent of ash had its specific gravity reduced, by oxidation or partial disintegration, some 8 or 10 points below normal.

Bituminous coal has the same characteristics as is shown by these tests of anthracite. Its specific gravity is, of course, less; but, taking almost any bituminous coal as it is mined and shipped, and testing it by the method just described, it will be found to consist of lumps and particles varying widely in ash and in specific gravity.

Tests recently made on typical bituminous coking coals from Pennsylvania, Alabama and West Virginia show that products with less than 5 per cent of ash and sometimes less than 4 per cent can be obtained from coals normally averaging, as mined, from 9 to 15 per cent of ash. This result is obtained with less loss of combustible in the refuse, than occurs in jigging. Even when considering the most practical work in the washing of these coals by jigging, we find the products carrying from 6 to 10 per cent of ash.

When all of the coal cannot be recovered by this process and made an especially low-ash fuel available for metallurgic use, a differential separation can be made, at a specific gravity that will yield a suitably low-ash product, together with a higher-ash product that will not carry too much ash to prevent its satisfactory use and sale as a steam or domestic fuel. This will be found practicable in nearly all cases where the separation of the low-ash coal is effected without fine crushing.

In the application of the sand-flotation process to

the washing of bituminous coals, a feature worthy of mention is the reduction of crushing to a minimum, as the large lumps of low-ash coal are recovered without fine crushing. Furthermore the removal of fines made in the mining, handling and crushing of the coal before it is introduced into the machine, eliminates most of the troubles of sludge sedimentation and recovery by keeping this fine material dry. Another feature is the clarifying of the water for re-use, which is an advantage not obtained in washing bituminous coal by the methods in general use.

Glen Alden Uses All Available Pumps to Unwater Mines

River Water Entered at the Rate of Half Million Gallons per Minute—Will Take Nearly Four Months to Unwater Beds

THE engineers of the Glen Alden Coal Co., of Scranton, Pa., are making rapid progress unwatering several of their mines which were flooded April 7 when the Lackawanna River broke into the National mine near Taylor, Pa.

An investigation to ascertain the extent of the damage done by the flood disclosed that it was the worst ever experienced by any company in the anthracite field. About two years ago, rains and melting snow poured volumes of water into cave holes on the mountain side. On this occasion, the main pumping station at the Hampton Water Shaft was all but lost, the water rising several inches on the pumproom floor. Recently, when the Lackawanna River broke into the mines, the pumps were completely submerged.

The surface adjacent to the pothole where the river entered the mine was seriously creviced and caved and had been so for many years. The mine operations at this point are close to the surface and the hillside back of the old breaker is covered with many caves and potholes. A few years ago, there was a serious squeeze in this mine. Many acres of ground subsided, and several men lost their lives.

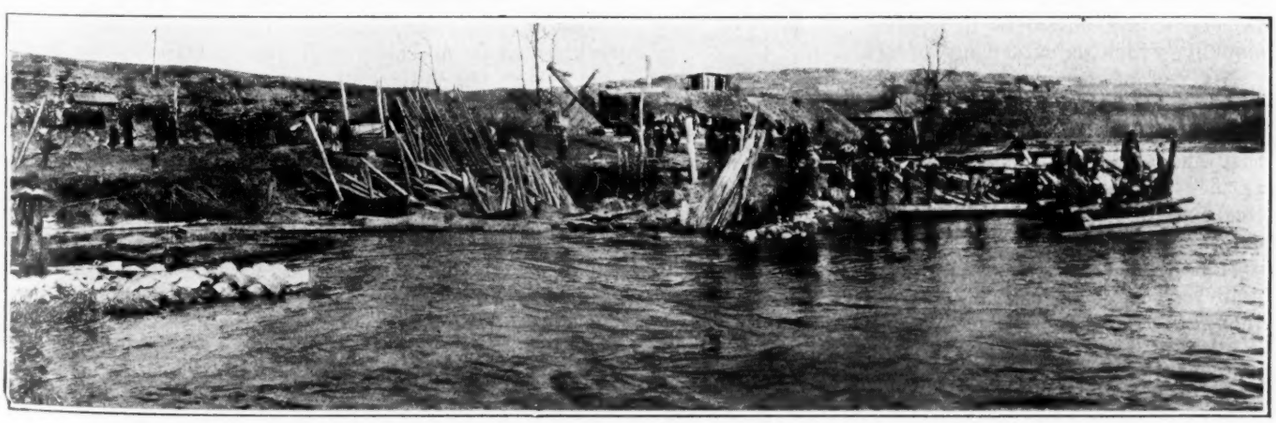
For years the anthracite mining companies have been building large breakers capable of preparing the output of several mines. As a part of this plan, the old breaker at the National mine, which is on the east side of the Lackawanna River, was abandoned and a tunnel was driven under the river to connect with the Taylor mine so that coal from the National mine could be prepared at the Taylor breaker. Knowing that the river bottom was close to the National mine operations at this point, the tunnel was made unusually narrow for double track, about 12 ft. wide.

Sometime ago, the earth over the tunnel a short distance back from the river's edge caved in and formed a pothole. The river, swollen by continuous rains, gradually washed away the earth between its bank and this point, and the ground finally gave way. Torrents of water rushed into the mine when the river turned its course into the hole.

For nearly two days the water flowed into the workings, part of the time at about 500,000 gal. per min. The natural drainage of the area is toward the Hampton pumping station about two miles away. Every effort was made to block the hole and stop the flood. Almost as quickly as bales of hay, bags of sand, timber, earth,

The Expensive Pothole

For many years nearly all the Glen Alden Coal Co. mines in and around Scranton have been interconnected in such a manner that most of the pumping can be done from one centrally located pumping station. The coal beds extend under the Lackawanna River and at many points run close to the surface, consequently a break under or near the river may cause the inundation of a large area of many mines and is always greatly feared.



An Innocent Looking Pothole Cost a Fortune to Fill When the River Overflowed and Flooded the Mines

Mine cars, bales of hay, bags of sand, timber and rails were sacrificed to stem the flood. Unfortunately the ground in this vicinity is very loose and it was easy for the water to wash it away. Only large heavy materials would stay in the hole; many bales of hay and bags of sand were carried hundreds of feet into the mine. The picture gives but a faint idea of the quantities of materials used. Most of the water took a direct course to the Hampton Pumping Station where five 5,000-gal. centrifugal pumps were unable to handle the water quickly enough to prevent their submergence. About two to four months will be required to unwater the various mines affected.

mine rails and mine cars were thrown into the gaping hole, they were washed on into the mine. A fortune was lost in a few hours.

The Hampton pumping station is located in a natural basin in the coal beds, and here nearly all the water from about eight mines is concentrated and pumped a distance of 550 ft. to the surface by five 5,000-gal. centrifugal pumps, each driven by a 1,000-hp. motor. Under normal conditions, two of these pumps will prevent the water from rising, but just before the flood three pumps were required owing to an increase in the volume of water running into the pumping station from the mines located on the mountain side.

When news was received that the river had broken in, all five pumps were put in operation, and for a time it looked as though the discharge from the pumps was sufficient to prevent the water entering the pumproom. However, the pothole at the river was worn larger and larger, and finally dams and temporary obstructions set up in the mines were washed away. When the sudden rush of water came, two mine foremen at the Sloan mine nearby were trapped and drowned. The water being up to their waists, the pumpmen were forced to abandon the pumps, which they left running.

After the flow of water was checked, some of the engineers went to the pumproom, and after considerable difficulty and wading in water up to their necks they found all the equipment completely submerged.

Fortunately, the pumproom is located in the Clark bed which is some distance above the Baltimore beds. Although much of the river water found its way to these latter they did not fill completely, and it is possible to drain a large quantity from the Clark bed to the lower beds, thus lowering the water so that the pumproom can be reached and cleaned out.

Material required to repair the pumps, motors and controllers has been ordered, but the repair work will be slow and difficult. In the meantime, pumping equipment has been transferred from other mines of the company and other coal companies in the immediate vicinity. It will take from two to four months to unwater the flooded areas.

The Hampton pumping station is the largest in the coal regions. Auxiliary power circuits were provided between the pump room and the company powerhouse nearby. Many protective features had been provided for the pumps and motors.

Such an important pumproom probably should have been surrounded with a wall or dam to prevent the water, even if it should rise higher than the pumps, from flooding the equipment. Perhaps it would be well to install more submerged-type vertical centrifugal pumps in the anthracite field, similar to those operated by the Hudson Coal Co. at a mine near Carbondale, Pa.

When the flooded area has been unwatered, much work must be done before it will be possible to resume mining in some of the workings. The rapid flow of water in the gangways has no doubt washed away much of the road beds, and tracks will have to be rebuilt. The timber which came through to the pumproom consisted of mine props and air stoppings along the haulage ways.

The Miner's Torch

Sameness

A SHORT time ago I was asked to make a little talk at a "Safety-First" meeting of plant executives employed by one large company and in introducing me the chairman stated that they had decided by way of variety to ask outsiders to address the meeting occasionally, which explained my presence.

His use of the word variety led me to ask some questions and I was surprised to learn that the different executives had reached a point where they felt that they had exhausted the subject of Safety-First so far as they were individually concerned, and for the life of them, they could no longer make talks that could be expected to hold the interest of their fellow employees.

It happened that only that day I had copied in my note book for future consideration the Bible quotation that reads like this: "There is no new thing under the sun" and the remarks of the foremen about having exhausted the subject under discussion reminded me of the quotation. Almost unconsciously I dismissed from mind the little speech that I had prepared for the occasion and ventured forth into a discussion of the Bible quotation. The impromptu talk that I made was received with so much interest that I have given the subject considerable thought since then.

It is possible to write about a single subject every day in the year and do it without repeating oneself and do it in an interesting manner, both as concerns the one who is doing the writing and the one who does the reading. If you doubt this read the daily comments of the man who reports the stock exchange happenings for your daily paper; or again, consider that for over seven years now a certain newspaper writer has been giving us almost daily articles about conditions in Europe and they are just as interesting now as they were the day he began.

There is no new thing under the sun yet there are no two persons or things under the sun that are exactly alike. If you question that, talk with an employment manager who comes in contact with hundreds of men seeking work, or better still, take a walk in the woods and count the different varieties of leaves that you find there.

The principal difference between the man who can exhaust the Safety-First subject in one paper and the man who can prepare an interesting Safety-First bulletin every day in the year is that one has imagination and the other either lacks imagination or does not make use of it, generally the latter.

I have about reached the conclusion that whenever you find a man who cannot talk interestingly about his work you have found a man who has reached a state where he is no longer interested in it. Imagination and interest walk arm in arm; of course no two men have the same amount of imagination and no two men can inspire you with the same amount of interest by word of mouth, yet you are never left in doubt as to the inspiration a man finds in his work if you discuss his work with him.

Moral: When you have seen a thing from one angle you have not exhausted the possibilities.

"Balanced Mines" Should Have Rock-Bottom Costs

Waste Motion and Lost Coal Are Reduced and Loose Ends Are Few Indeed Where the Whole Property Is Co-ordinated All the Way from Hoisting Engine to Cutting Machines

By Charles E. Anderson
Christopher, Ill.

AT EVERY mine inevitably arises the problem of putting its various parts—its workings, its equipment and its departments—in balance. Though it is entirely practical to design the entire operation so that each part will fit into a co-ordinate whole, this is seldom realized. The engineers about to open a new mine may try to strike such a balance, but companies with an old and poorly systematized mine too often think their cases are hopeless and that they must go on losing coal and paying too high a cost for what they do get. They should not be so helpless. There are ways in which such operators can put into proper balance the length of their panel entries, panels and partings and the size of their cars and tracks. These methods, properly applied, should reduce their costs.

What relation does the length of panel entry have to the length of a parting on the main-line haulage? What relation has it to the length of loaded and empty tracks on the main bottom? What relation has it to the size of locomotives in use, both gathering and main line? What relation to the size of steel on the haulage roads has it? How can we determine what size the shaft should be, the size of the hoisting ropes, the height of tipple and size of hoisting engines?

These vital questions can be answered correctly in every case by a simple analysis of the local conditions. It is taken for granted that in locating the shaft of a new property, boreholes have been sunk and levels run on them, thus giving the loaded cars the advantage of the dip. Of course, other considerations enter into location of the hoisting shaft, the most important being the necessary space for loaded and empty railroad cars and the grades for handling them.

In machine mines, the cutting machine is the basic factor with which to begin. The panel entries should be just long enough to provide a full machine run on each panel and still leave a sufficient barrier pillar. In some sections there is an agreement between the operators and miners' union that arbitrarily sets the number of men that a machine may cut coal for, and in such cases the length of panels should be governed by this number.

We will say that fourteen men constitute a full complement of men for a machine. Then fourteen rooms will be necessary. Owing to the condition of the roof it is found that the rooms should be opened at 50-ft. centers, and that a barrier pillar 125 ft. thick must be left. We must provide panels having a total length of 800 ft. in order to obtain space for fourteen rooms on 50-ft. centers and leave the desired barrier pillar. Thus we have established the proper length of panel.

As a panel has fourteen rooms, and as the men work "double," seven-car trips are required in order to give a turn of one car to each pair of men. There being one full machine run on each panel, and twenty-eight men on each pair of panels, one gathering locomotive will be needed to care for each two pairs of panels, having fifty-six men assigned to it, or four full machine runs. This requires space for twenty-eight cars on the parting for both loaded and empty tracks for each locomotive so used. Should there be two locomotives working on the same parting with a full complement of men, and an additional locomotive pulling from the men that are working the heading for development, space will be needed for fifty-six cars for the two locomotives having four full machine runs, and fourteen additional cars for the heading men, making a total of seventy cars. Under this system it will be found that an equal turn of cars will be pulled for all the men in the section.

At one mine working under this system there was a fairly good bottom and 8 ft. of coal was being taken. The operators planned on hoisting 5,000 tons per day of eight hours; so it was decided to use as large cars as possible, keeping in mind that the men must push the empty cars into the working face from their room switch. The management consequently decided to use a 5-ton car, having roller bearings and 20-in. wheels. It was found that the car would have to be built 10 ft. long and 24 in. high to hold that quantity of coal. The gage of the track was 42 in., this width being chosen because the company had much equipment of this gage available. As they had decided upon a 10-ft. car it was necessary to have 700 ft. of empty and loaded space on the parting in order to provide room for seventy cars.

Having decided upon a 5-ton car, and having to han-

HOW "MINE BALANCE" AFFECTS COSTS

WHAT does it cost a mine owner to have his mine "out of balance?" A little study of each property so afflicted will convince the operator that the costs are heavy. He can find lost motion everywhere and lost motion is costly. He can find machines and loaders tied up in one section for want of transportation while a motor is wasting time handling ridiculously small trips in and out of another section where machines are few. He can find much inequality in distances between workings and partings. He can find some partings always congested while others have unused space expensive to construct and maintain. He can see the top coming down or the floor coming up on pillar coal and even on room coal that could have been recovered if the workings in that part of the mine had been operated in unison, under a proper system. Hence the need for mine balance.

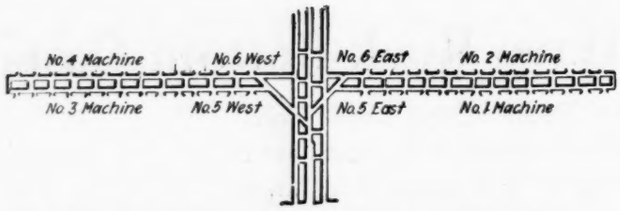


Fig. 1—On This Type of Panel, Gathering Motors Serve More Men Than Is Customary in Most Mines

Locomotive goes into one panel entry to leave empties spotting them at the mouths of the rooms and then switches to another to get loads.

dle seven-car trips over a maximum grade of 3 per cent in the panels, the size of the locomotive necessary was found by using the following method, suggested by a statement made by J. T. Beard, "A tractive effort of 30 lb. per ton is required to haul a load on level track, together with 20 lb. per ton additional for each per cent of grade." The maximum grade being 3 per cent, the net load 10,000 lb. and the weight of a car 3,500 lb., the necessary drawbar pull for a seven-car trip is found to be $7(30 + 60)\ (10{,}000 + 3{,}500) \div 2{,}000 = 4{,}252.50$ lb.

Again quoting J. T. Beard: "The tractive effort of a locomotive having steel-tires is 25 per cent of its weight, plus 10 per cent if sand is used." The weight of the locomotive needed to pull the trip, therefore, is $4{,}252.50 \times 4 = 17{,}010$ lb. or approximately $8\frac{1}{2}$ tons. As the maximum grade is never of great length, advantage was taken of the 10-per cent allowance for sand and 8-ton locomotives were installed. They have been found to be of ample weight.

The size of steel for the panels was found by the following rule, also given by J. T. Beard: "The weight of rail in pounds per yard necessary for a given weight of locomotive is found to be ten to sixteen times the weight in tons, on each of the drivers, where four drivers are used." So we have $16 \times 8 \div 4$ or 32 lb. per yard, so 30-lb. steel was installed. This also has proved sufficient.

Main Locomotive to Haul 35 Cars Each Trip

The main-line locomotives will be required to haul in a single trip from the inside parting as many cars as the two locomotives gathering from rooms will bring to that point in two trips and one locomotive gathering from the headings will bring in one trip. Thus the main locomotive must be expected to haul at each trip five gathering trips of seven cars or thirty-five cars. As the main bottom to accommodate the main-line locomotive must provide space for two full trips of empty and an equal number of loaded cars, space will be needed for 140 cars, or seventy on either side. As the mine under discussion uses cars that are 10 ft. long, both loads and empties will require 700 ft. of track. Add to this length the needed space for diamond switches or other equipment to be installed, and the total required length of the main bottom is established.

The weight of the main-line haulage locomotive can be found in exactly the same manner as that of the gathering locomotives. In this mine, most of the main entries were either level or favorable to the loaded trips, but some gradients slightly exceeding one per cent had to be left against the loads. Using the same method as before the drawbar pull $= 35(30 + 20)\ (10{,}000 + 3{,}500) \div 2{,}000 = 11{,}812$ lb. $= 5.906$ tons or the draw-bar pull necessary to haul the thirty-five car trip over the maximum gradient along the road which is one per cent. Allowing the locomotives 25 per cent of their total weight for drawbar pull we have $5.906 \times 4 = 23.624$ tons which is the necessary size of locomotive to handle the trips over this grade. Twenty-five-ton main-line locomotives were installed and they have proved satisfactory.

The weight of steel for the main-line track was computed in the same way as that for the inside locomotives, except that a smaller factor was used in this instance. Using the factor of ten instead of sixteen we have $10 \times 25 \div 4 = 62.5$ lb. per yard. Sixty-pound steel was installed with perfect satisfaction.

The advantages of such a system are at once apparent. There is no lost motion in this plan, except that the mining machines are limited to fourteen men. This cannot be overcome until actual tests have been run and new agreements made. The number of men on a machine can be increased to eighteen and still be taken care of under this plan, simply by adding a little to the weight of the haulage locomotives and the track.

More Men Served by Gathering Locomotive

The number of men served by the gathering locomotives will be seen to be considerably higher than is generally found in most mines, but let us analyze it. (Fig. 1.) We will number the machines being served by one locomotive Nos. 1, 2, 3 and 4. Nos. 1 and 2 are located on the 3rd and 4th East panel, and directly across from them are Nos. 3 and 4 in the 3rd and 4th West panel.

The locomotive will take seven empties and spot them in the 3rd East panel for machine No. 1, proceed through the last angle crosscut near the face of the panels and gather seven loads from machine No. 2 in the 4th East panel, leaving No. 2 gang without empty cars for the time being. Having placed these seven loads on the parting, the driver will now take seven empties into the 3rd West to machine No. 3, and again go through the last angle crosscut and pick up seven loads from machine No. 4 in the 4th West panel.

Putting these loads on the parting he will go into the 4th East panel with seven empties to machine No. 2, cross through into the 3rd West panel and gather up the seven loads there. After depositing these on the parting he will return seven empties to machine No. 4 in the 4th West panel, pulling machine No. 3 in the 3rd West panel as he comes out, thus completing his turn of singles to the four machines.

This has required him to make four trips, and as he should not get less than ten tons per man, he will be required to make a total of sixteen trips in order to get the proper quota from his territory. This gives him a full half hour to make each trip. It will be

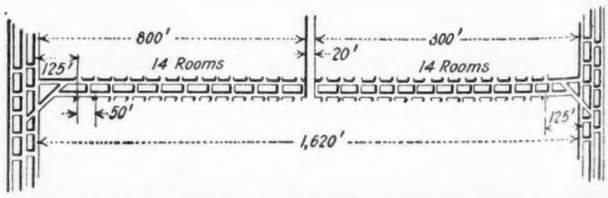


Fig. 2—Cross Entries Should Be Turned So That Panel Entries Will Face on Either Side

Each entry has length enough for fourteen rooms and a barrier pillar 20 ft. thick. The rooms are set on 50-ft. centers.

found that he can do it in less time and that he will average twelve tons per man or more. By this system the gathering locomotive driver will be required to gather 112 cars to complete his proper day's work, which will give a total of 560 tons per locomotive so used. As a matter of fact some of them actually average 125 to 140 cars per day. The effect upon the haulage costs readily can be seen.

There is another point to be considered in connection with the length of the panels. It is the recovery of the pillars, one of the most important features of mining, yet one that is sometimes sadly neglected. There is a great difference between extracting pillars in live workings and extracting them in workings that have been standing a long time. Where all the rooms are driven up together and work is started on the pillars immediately after they have been driven their proper distance, it is possible to recover a larger percentage of the pillars if due care is taken to concentrate the work so that a "break" can be obtained at the proper place and the weight relieved.

When more places are turned on a panel than the machine can cut, there are just that many rooms standing while the rest are driven up. The laggards are bound to take weight and many of them will cave so high that no pillars can be drawn. Under these conditions every attempt to extract them fails, and sooner or later it is decided that the pillars cannot be recovered in "this particular mine" and the effort is not renewed.

Owing to the varying conditions in each field of mining, no set rule for recovering pillars, of course, can be given, except that the work must be so conducted that the roof will be made to break and relieve the weight. However, no case has ever come to my attention where pillars were drawn successfully unless the work was done immediately after the rooms were driven up.

The length of the panel entries also determines the distance between cross-entries (see Fig. 2). These should be turned so that panel entries can be driven on either side. Consequently, twice the length of the panel entries plus enough to leave a small pillar, where it is not advisable to hole through, gives us the proper distance for turning the cross-entries. In the case cited above, where there are fourteen rooms on 50-ft. centers, panel entries are 800 ft. long. To find the proper distance to turn the cross-entries we have $(800 \times 2) + 20 = 1{,}620$ ft. A rigid following of this rule will keep all sections of the mine balanced.

Except in mines that are nearly finished, the workings can be re-arranged so as to conform to the system outlined and to co-ordinate each department. Where rooms have been turned in the panels indiscriminately as fast as they were reached nothing can be done except to work them out in the best way possible and get out of them; but in all new work the plan described can be followed by simply rearranging the system to conform to the general outline given.

The following instance is a shining example of correcting old workings. The cross-entries in a certain mine were turned so that there were thirty-three rooms on the panels between entries and barrier pillars of 125 ft. The men constantly made it a practice to turn rooms on the panels as fast as they came to them, so that they had room for only one machine in a panel at one time.

In one case miners reached room No. 25 and holed into workings of the same panel being driven to meet it from the next cross-entry. There were only eight rooms on that side, the first two being driven up to the full distance. The next rooms were nearly done, while the rest were shorter as the point where they holed was approached. All switches were turned so that all the coal was taken out through the cross-entry farthest from the shaft, and pillar work started in room No. 4, counting from the side nearest the shaft.

The first three rooms in the cross-entry had caved so high that none of the pillar coal in them could be drawn and all this part of the work was showing weight badly. Before all the first pillar was recovered a squeeze started that extended through all the finished rooms, and part of the rooms that were being extended. One machine was taken out of the territory and as the remaining machine drove the rooms next to the squeeze up near their distance, the squeeze would start and run the men out of other rooms as well.

To correct this condition the next pair or cross-entries was made twice the length of the panels, plus 20 ft. The first pair of cross-entries was stopped entirely, and the second pair was converted into main entries on either side of the mine, new cross-entries beyond all development were driven through between them, and panels driven from these.

In the original plan, the men drove the main entries east and west, cross-entries north and south, and panels parallel to the main entries. Only the second pair of cross-entries on either side had been turned when the company decided to make the change.

In the new east and west development the original plan was followed but the distance between cross-entries was made to conform to the fourteen-room limit. That was simple, but in the north and south development the mine had virtually to be turned around. The first pair of cross-entries on either side was stopped, and the second pair on either side was converted into main entries. Cross-entries were driven through between them, from the 3rd and 4th South on the East, to the 3rd and 4th South on the West and panels were turned at regular intervals to the South from these.

WILL THIS SAVE SOME "DOOMED" HIGH-COST MINES?

THE number of men following each cutting machine is a basic element in laying out the system by which the mine is worked. Because someone didn't realize this, who operated a mine with fourteen-man units and tried to operate panels having thirty-three rooms, he lost much recoverable coal and spent a good deal of money to revise his system. However, in many an old and high-cost mine, the erratic plans can be revised as Mr. Anderson outlines in this article. A careful study of conditions and the adoption of a system similar to the perfectly balanced one described here, might help to keep certain mines in this country working during the coming year which now appear to be doomed. The subject of "mine balance" therefore is worth consideration.

New cross-entries were driven between the old ones when the new south mains had progressed far enough. The balance of the development conformed with the rest of the work. The layout was made the same way on the north side, and a model mine was the result.

All these changes were necessary because somebody overlooked the fact that fourteen men constituted a full complement for a machine at that mine. The size of the machine units was set by agreement between the company and the miners' union, yet thirty-three rooms were turned on the panels instead of fourteen.

To balance some other features of a mine a little care is also necessary. The length of the car will determine the width of the shaft, and the proper allowance for the buntons, guides and cages, and for the space needed for pipe and wire work will determine its total length.

The weight of the cage, plus the weight of the car will show the proper size of the hoisting rope by following this rule: "Add the total weight of the cage and loaded car. Multiply this by 7—the factor of safety—and divide by 50 (if the sum so obtained is above 50, whereas if it is below 50 it must be divided by 40). Finally extract the square root of the quotient." This is the diameter of a plow-steel rope, having six strands of nineteen wires to the strand.

The height of the tipple is governed by the number of grades of coal that it is desired to make and upon whether gravity or mechanical screens are to be used, but I will not enter into a discussion of this question in this article.

The total weight of the coal to be hoisted—the cages and cars balancing each other—multiplied by the speed per minute, and divided by 33,000 will show the necessary horsepower of the engine. Friction of ropes and cages will also have to be added, and this figure will also show the power of the boilers necessary, unless other equipment using power from them is to be installed.

Thus it is shown that everything about a mine can be balanced and each department must be co-ordinated with all the others if lost motion is to be avoided. The general efficiency of the mine is affected by the efficiency of each department, and many times coal is mined at too high cost to be profitable because one or two departments are not functioning properly. Only a proper analysis will show where the trouble lies and relieve this situation.

Use of Rescue Apparatus and Gas Masks Increasing

One Hundred Apparatus Men at Recent Mine Explosion—Gas Mask Safe Where Enough Oxygen Is Present to Keep Safety Lamp Alight

INSURANCE companies, by offering a reduction in premium for each trained first-aid man employed by a mining company, are endeavoring to increase the interest of coal companies in first aid, said D. J. Parker of the U. S. Bureau of Mines in an address before a safety conference called at Pittsburgh on the occasion of the visit of two delegates of the British Government recently. In an address on "Developments in Mine Rescue and First Aid" Mr. Parker said that Dr. Holmes' dream of the spread of privately owned rescue apparatus is beginning to be realized. At a recent mine explosion in western Pennsylvania there were 90 trained apparatus men from near-by operations and only 10 from the U. S. Bureau of Mines, making what is believed to be the largest number of trained and equipped helmet men that has ever participated in rescue work following a mine disaster.

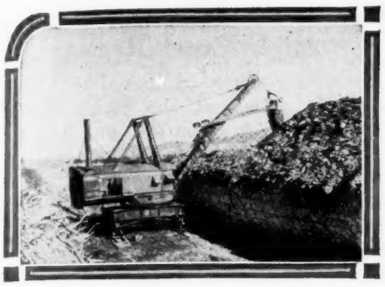
A. C. Fieldner followed with a talk on the "Use of Gas Masks in Mines," outlining the application and limitations of this equipment. Atmospheres in unsealed burning mines may, or may not, contain enough oxygen to support life and if they do not, a gas mask is valueless. It will change carbon monoxide to carbon dioxide so that the wearer will be saved from a death by poisoning only to die by asphyxiation. That the air in open mines with burning areas may be so greatly depleted of oxygen as to be irrespirable is a conclusion that has been reached by a research fellow at the Pittsburgh station of the Bureau who has been investigating that subject.

J. J. Walsh, state secretary of mines of Pennsylvania, said that the return air from five fires in anthracite mines on analysis was shown to contain 16½ per cent or more of oxygen. In three of these mines safety lamps would not burn. This led State Inspector Richard Maize to say that gas masks were of little value if they could only be used where safety lamps would burn. The reply was that in case of a mine fire the suitable action of a safety lamp did not assure that conditions were safe, for such a lamp will burn in a percentage of carbon monoxide that would be speedy death to anyone breathing it.

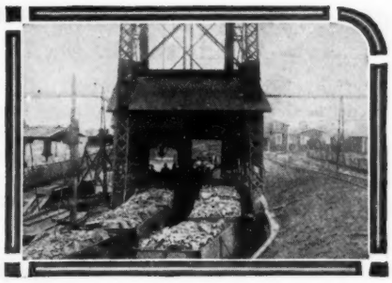
Mr. Maize then asked what percentage of carbon monoxide in a mine atmosphere would make the use of gas masks dangerous. Mr. Fieldner replied that the limitations of the gas mask are fixed by the intensity of the heat generated. Enough heat is evolved in the canister by the oxidation of a 6 per cent mixture of carbon monoxide to melt the canister. Mr. Cotts of the Bureau remarked that a safety lamp cannot be burned in an atmosphere containing more than 2 per cent of carbon monoxide. A safety lamp will burn in a 2 per cent concentration. In such atmospheres a self-rescuer gas mask has been worn for 20 minutes. A number of samples taken in fire zones show that the quantity of carbon monoxide in the atmosphere is usually less than 1 per cent. Mr. Cotts declared that a gas mask will give proper protection wherever a safety lamp will burn.

Henry Walker, deputy chief of the Mines Department of Great Britain, said he was surprised to hear that 1,600 gas masks were available for use at United States mines. He added, "I didn't know that gas masks were in industrial use." Dr. J. J. Rutledge said that every state inspector in Maryland is equipped with a "self rescuer" gas mask.

THE HILLMAN COAL & COKE CO., sets a good example, continuing its plan of electrifying its old steam-equipped mines one by one, not delaying the program because of low coal prices. The job continues according to a schedule long ago determined. Low prices of coal do but make such economies the more necessary, cost of coal replacing volume of output as the essential element of profitable operation.



News Of the Industry



Coal Transportation in Foreground At National Capital

Influences Work to Spread Movement Evenly Over Year—Lack of Orders Now a Stumbling Block—180,000 Coal Cars Available—Inability to Control Supply to Inefficient Operations an Obstacle

By Paul Wooton
Washington Correspondent of *Coal Age*

With hearings in progress before the Interstate Commerce Commission on the Lake cargo rate case; with mine-rating and car-distribution rules about to be taken up for the consideration of proposed revisions and with Sec. 28 of the Merchant Marine Act under debate on Capitol Hill, matters involved in the transportation of coal promise to be on the tapis for some time to come. In addition, strong influences are at work in an effort to spread the coal movement as evenly over 1924 as was the case in 1923. *Railway Age* is alarmed by the recent abnormal decline in coal shipments and declares editorially that "if the present low rate of production continues, there later will be an abnormal increase in production and in demands upon the railways for transportation. This abnormal increase in the demands upon the railways will cause congestion in the handling of all traffic and abnormal and unnecessary operating expenses that the shipping public will have to pay."

First Move Up to Shippers

The editorial then proceeds to advise a resumption of shipments, but it places the burden of the obligation upon the shippers. The fact that shippers cannot ship until consumers place their orders seems to have been overlooked, as is indicated by this extract from the editorial:

"One of the principal reasons why the railways were able in 1923 to handle a record-breaking freight business without car shortages, congestions or delays, . . . was that shippers gave their freight to the roads in unprecedentedly uniform volume throughout the year. Fearing that there would be a car shortage when the peak of business was reached in the fall, many shippers . . . heeded the injunction to ship early.

"The movement of freight in 1924 already has been subjected to wide fluctuations and the seasonal fluctuations threaten to become as great this year as in years previous to 1923 unless more shippers can be aroused to the desirability of shipping early and avoiding the usual fall rush."

There has been no time in a decade that the producers of coal would rather ship than at present. If some means can be devised to convince consumers that they should make purchases at this time, the producers would be as pleased as would the railroads were it possible to put into immediate service the 180,000 coal cars now standing idle.

There was advance announcement, and it has been reiterated frequently, that no adjudication of the Lake cargo rates would be made in time to have a bearing on this season's movement. For that reason it cannot be ascribed as a cause for the slowness with which the Lake business is getting under way. In February the Interstate Commission gave ten days of its time to hearing the complaint of the Pittsburgh and Pittsburgh No. 8 operators, who are seeking a widening of the differential between the short-haul rates from the Pittsburgh district and northern Ohio to Lake ports and the long-haul rates from West Virginia and other Southern fields.

After a recess of two months, the commission on April 22 resumed the Lake cargo hearings. As this is written the railroads are putting in their testimony. These witness will be followed by those of the Southern operators.

Judging from the evidence which has been taken thus far, it would seem that there is going to be great difficulty in proving that the long-haul rates are unreasonable. On the other hand, there is increasing reason to indicate that cuts more properly could be made in the short-haul rates. This is having the effect of lining up the short-haul roads against the Pittsburgh operators.

Of scarcely less traffic interest are the proposed changes in mine ratings. There is sharp cleavage between the coal operators on this question. Generally speaking, the larger operators favor the proposed changes which are avowedly aimed at the inefficient and uneconomical mine. Their feeling is that the consumer who contracts for his coal should be protected as against the consumer who does not provide in advance for his fuel. As it is, contract buyers, during periods of car shortages, frequently cannot get deliveries on their contracts because the mines of less efficiency come into production and dilute the car supply.

Kelvin Medal for Thomson

Elihu Thomson, one of the founders of the General Electric Co. and director of the research laboratory at the Lynn (Mass.) works, sailed for Italy, April 26, to be gone three months and tour several European countries. In England he will receive the Lord Kelvin gold medal, being the first American to be so honored. The medal award was established by British and American engineering societies.

The principal obstacle to the change seems to be a legal one. There is grave doubt as to the legality of denying transportation to a shipper because that shipper did not furnish tonnage during a period of car surplus. There are other objections, however. Some fear that the proposed rule would result in the sale of a large amount of coal at cost or even below in the effort to build up a commercial rating which would permit comparatively large shipments during the car-shortage period. Not only would this inject a new inducement to the speculator but some fear that it would give an additional advantage to the non-union mine.

Could Nullify Assigned-Car Ruling

With their longer operating time, it is feared that the non-union properties could build up a commercial rating which would give them an undue proportion of the cars during an emergency. It is thought in some quarters that the proposed rule would nullify any advantage which has come from the victory in the assigned-car case. The railroads as the largest single body of consumers would be in a position to get most of their coal again at cost because of the desirability of establishing a better commercial rating. The producers then would have to look to other consumers for all of their profit.

Much is being made of the contention that such a rule would give a federal bureau an important control over commercial transactions. It would make it necessary for the commission to take judicial notice of union and non-union mines.

Many hold the opinion that the railroads now are so well supplied with equipment and have their properties in such good condition that they will be able to continue to meet practically any demand that is put upon them. The policy of the railroads to require each line to own enough equipment to protect all freight originating on it is bearing fruit and is an important factor in the prevention of car shortages.

M. F. Burns Dies Suddenly At Age of 70

Michael F. Burns, president of the retail coal firm of Burns Brothers from its organization until his retirement, April 8, died suddenly last Monday at his home in New York City. He was about 70 years old. Mr. Burns had been one of the leading men in the retail coal industry of the United States for a generation.

From time to time during the last two years there was talk of a change in the management of the company, but nothing came of it until Mr. Burns presented his resignation, March 12, last, to become effective April 1. On April 8 the board of directors accepted Mr. Burns' resignation and appointed his son, Frank L. Burns, to the presidency of the company and elected the elder Burns chairman of a newly created advisory committee.

Shortly after the World War, at the time of the widespread discussion of high coal prices, Mr. Burns testified before the Senate committee investigating the situation. He stated that his company had made a profit the previous year of $1,200,000, and would earn $1,500,000 the succeeding twelve months. He said his own salary was $50,000 a year. Mr. Burns also was a director of the Coal & Iron National Bank of the City of New York, president and director of the N. Y. & N. J. Real Estate Improvement Co., and a director of the U. S. Distributing Corporation. Mr. Burns was a widower.

"Serfdom" of Miner Is Past Says Civic Federation

Extracts from a survey made by the Department on Current Economic and Political Movements of the National Civic Federation into industrial, social and civic changes during the last several decades show some interesting sidelights on conditions in many industries.

In the preliminary report presented to the Federation at its meeting in New York City, on April 24, John Hays Hammond, chairman of the department, stated that the survey was taken to ascertain just what "lies back of the claims of the apostles of gloom that our country is going on the rocks."

The first field explored was that of "Labor," and the department appealed to the 115 national organizations affiliated with the American Federation of Labor, as well as to the railway brotherhoods, "with results a little less than astounding," says the report.

After setting forth wages in transportation lines, needle trades and other lines of industry the report has this to say of the mining field:

"Take the workers in the coal mines, comparing their conditions and wages back in the '80's and even the '90's with those of today. The following extract from the report of the A. F. of L. proceedings at its 1902 convention throws some light on this:

" 'For more than twenty-five years the conditions of the miners had continually deteriorated. Many of the miners had been often supplanted by others, and through a system of espionage, victimization and company stores, their organization was destroyed. No protection was, therefore, afforded to the miners to check the power and avarice of the mine owners. The misery and poverty obtaining in the region surpassed all descriptions disclosed during the contest of 1900. The miners were veritable serfs of the companies: they were unable to leave the region by reason of their never being in possession of current money.'

"Take the case of the anthracite common and outdoor laborers, where, in 1895, drivers were getting $1.10, furnace firemen, $1.05, steam pumpers $1.15 and so forth, and where in 1900 they worked only 150 days a year. Then consider that the recent anthracite contract, covering all the miners, gives 270 days of work and a minimum of $4.62 for an 8-hour day. The contract miners receive a great deal more, frequently reaching the building-craft standard."

Mine Bosses and Foremen Liable for Gas Blasts

Mine bosses and foremen may be charged with manslaughter if coal miners lose their lives through failure of their superiors to prevent gas explosions, according to a decision by the Oklahoma Criminal Court of Appeals at Oklahoma City. The opinion was delivered in affirming the conviction and sentence to one year's imprisonment of Martin Clark, a pit boss in a Latimer County (Okla.) mine. Clark was on duty when an explosion killed ten men in the mine Aug. 21, 1920. The boss was found to have been negligent in taking proper precautions to warn the men of the presence of noxious gases in the mine.

Henry Wants a Dock Now

The latest prospective purchaser for the 600,000-ton dock of the Superior Coal & Dock Co. at the Head-of-the-Lakes is none other than Henry Ford. In fact the deal has progressed so far that Mr. Ford has made a definite offer for the property of an amount sufficient to cover the investment value of the property, but there are certain obstacles to the sale which may be eliminated soon. If they are overcome, by midsummer Mr. Ford will have docking facilities which will be of value to him in handling coal produced at his own mines and hauled to the Lakes on his own rail lines for consumption by his own huge power plant at the Twin Cities. The Superior Coal & Dock Co. is a subsidiary of the Maynard Coal Co., now in the hands of receivers. The dock has been offered to various dock interests without awakening any interest.

Lull Before a Storm in Straight Creek Region

It is beginning to look like a lull before a storm at the plant of the Liberty Coal & Coke Co., on Straight Creek, near Pineville, Ky. There has been no shooting since April 3 but a good deal of ill feeling against the state troops has been worked up by men who refused to work at the reduced scale of wages. Evictions from company houses are due April 30. This may result in another flare-up.

On April 16 Frank Daugherty, State Attorney General, ruled on a request from Adjutant General Kehoe, holding that the Kentucky National Guardsmen could not be used in eviction of occupants of company houses, as they had no authority in the matter. Kehoe had informed Daugherty that in his opinion disorder was caused by persons illegally holding company houses and who had violated their leases with the company. Kehoe wished to know whether guardsmen, in order to prevent lawlessness, could legally arrest such persons as trespassers and subject them to forcible eviction.

Daugherty pointed out that the company had recently obtained a federal injunction prohibiting interference with its operations on the part of strikers, and as a result of that injunction the company must appeal to the federal court for relief from any violation of the injunction.

Keystone Employees Accept 20 per Cent Wage Cut

A 20-per cent wage reduction by the Keystone Coal & Coke Co., the largest independent fuel operator in Westmoreland County, Pa., became effective April 24. The cut is general, including all employees from day laborers up to coke drawers. Between 8,000 and 10,000 men are affected.

The Keystone company is operating on a three-day and four-day schedule at its plants, all men getting half-time or over each week. Inability to continue operations at the old wage scale was given as the reason for the reduction.

The men are taking the cut without complaint and full crews reported at all plants.

Coal Consumption by Utilities Drops; Power Output Up

Electric public-utility plants consumed 3,374,384 net tons of coal during February, according to a report just issued by the Geological Survey. This compares with 3,673,447 tons consumed in January and 3,394,877 tons in December. Fuel oil consumed by utility plants in February totaled 1,546,289 barrels, compared with 1,602,745 barrels in January and 1,472,946 barrels in December.

The average daily production of electricity by public-utility power plants during February was 168,300,000 kw.-hr., which exceeded all previous records, being slightly higher than that for January.

Accidents at Coal Mines Killed 339 in March

Accidents at coal mines in the United States during March, 1924, killed 339 men, according to a report by the U. S. Bureau of Mines. Included in this number are 172 fatalities caused by an explosion at Castlegate, Utah, on March 8, and 24 fatalities resulting from an explosion on March 28 at Yukon, W. Va. The fatality rate for the month was 7.06 per million tons, based on an output of 48,023,000 tons, as compared with 2.69 in the previous month and 3.26 for March last year, based on a production of 56,184,000 tons of coal. During March, 1923, only one major disaster, a coal-dust explosion, occurred, resulting in the loss of 10 lives.

During the first quarter of the present year 750 men have been killed by accidents and 160,094,000 tons of coal have been mined, the fatality rate being 4.68 per million tons. During the corresponding period last year 692 lives were lost, the production of coal was 165,008,000 tons, and the fatality rate was 4.19. For bituminous mines alone, the fatality rate for 1924 to the end of March was 4.60 per million tons, as compared with 3.95 for the corresponding months of 1923; for anthracite mines the rate per million tons was 5.16, as compared with 5.49.

Explosions of gas and coal-dust and accidents by explosives show an increased fatality rate per million tons in 1924 as compared with the first quarter of 1923. Substantial reductions are shown in the fatality rates for falls of roof and coal, haulage accidents, and accidents due to electricity, as indicated by the following figures:

	First Quarter, 1923	First Quarter, 1924
Falls of roof and coal	1.775	1.718
Haulage	.618	.525
Gas and coal-dust explosions	.994	1.786
Explosives	.139	.163
Electricity	.103	.069

W. W. Inglis

In a statement to a representative of *Coal Age*, W. W. Inglis, president of the Glen Alden Coal Co., declared that the work of preparing for operation the four Glen Alden mines recently flooded by the Lackawanna River will require nearly two months. One million gallons of water is being pumped from the operations daily, three shifts of workers being employed. The loss in production of hard coal is estimated at 2,000 tons a day.

Report Shows Kentucky Coal Is Taxed Aplenty

A report of a special commission to investigate coal-land taxation would indicate that Kentucky coal is now taxed aplenty, and that the defeat of the coal-tonnage bills in the General Assembly of 1924 was no more than just. The special commission with an appropriation of $20,000 for 1922 and the same amount for 1923, made a report to Governor Fields which was made public on April 23.

The report showed that coal-land assessment had been raised 43.2 per cent in four years, and, according to John B. Lewis, chairman of the tax commission, may be increased in some counties next year. The increase in agricultural counties in the same period was but 7.1 per cent.

According to the report, during the four years the total (land, mine equipment and improvement) in coal-bearing counties shows a rise of 47.7 per cent.

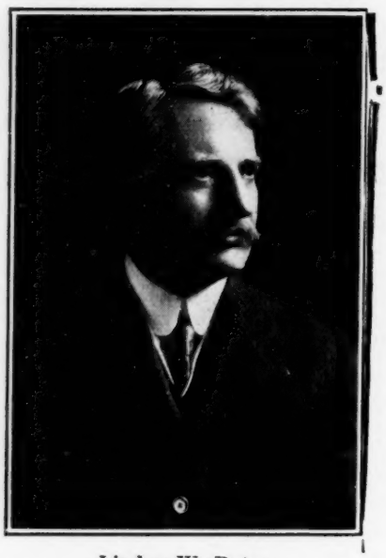
Eighteen counties produce 85 per cent of the coal mined in Kentucky, with the following percentages of assessment increase in 1923 over 1919: Bell, 12.5; Clay, 17; Floyd, 102; Harlan, 90; Hopkins, 8; Johnson, 43; Knott, 52; Knox, 16; Laurel, 7; Leslie, 19; Letcher, 112; Muhlenberg, 29; Ohio, 31; Perry, 136; Pike, 102; Union, 9; Webster, 4; Whitney, none.

P. T. Colgan, Middlesboro, Ky., having twenty-five years' experience in the coal industries in eastern Kentucky and West Virginia, and J. L. Smith, Danville, with ten years' experience, with other engineers, made the report, Chairman Lewis said.

Coal-Mine Fatalities During March, 1924, by Causes and States

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1924	1923
Alabama	2		1										3													3	8
Alaska																										0	0
Arkansas																										0	0
Colorado												1	2													2	5
Illinois	10		1			1		1					16													16	10
Indiana	1		1										2													2	5
Iowa	1												1													1	1
Kansas	1												1													1	4
Kentucky	6		3			2							11													11	10
Maryland						1							1													1	1
Michigan																										0	1
Missouri																										0	2
Montana	2												2													2	1
New Mexico	2												2													2	0
North Dakota																										0	0
Ohio	3		2										5													5	8
Oklahoma			1										1													1	0
Pennsylvania (bituminous)	19	2	4	1				1					27													27	31
South Dakota																										0	0
Tennessee			1										1													1	2
Texas																										0	0
Utah	1		2		172								175													175	4
Virginia	1												1													1	2
Washington	1												1													1	1
West Virginia	11	1	6	1	24	1				1			45											2	2	47	37
Wyoming	3												3													3	2
Total (bituminous)	64	3	26	2	196	5		2		1		1	300											2	2	302	135
Pennsylvania (anthracite)	16		3	5		7						2	33	1		1		2	2						2	37	48
Total, March, 1924	80	3	29	7	196	12		2		1		3	333	1		1		2	2					2	4	339	
Total, March, 1923	85	10	28	9	12	9	1	5		1		3	163	2	1	2		5	3	1	1		3	7	15		183



Lindon W. Bates

This internationally known hydraulic engineer, whose expert knowledge was manifested in the filling of the Kansas City Stockyards, the excavation of the Chicago Drainage Canal, the dredging of the Kaw, Mississippi, Scheldt, Volga and Danube rivers, the building of a harbor for Brisbane, Australia, and the raising above flood level of Galveston, Texas, died in Paris, April 22, from a stroke of paralysis. He was born at Marshfield, Vt., in 1858, and was a resident of Mount Vernon, N. Y. To mining men he is remembered as the inventor of colloidal fuel, a mixture of oil and pulverized coal, a dense and mobile fuel especially desirable for use on ships.

Wholesale Coal Convention Plans Nearly Ready

The Convention Committee of the American Wholesale Coal Association, of which J. W. Johns of Pittsburgh, Pa., is chairman, is rapidly concluding arrangements for the association's convention, to be held at the Greenbrier Hotel, at White Sulphur Springs, W. Va., June 3 and 4. The business sessions will be held in the morning of each day.

The committee announces the acceptance of invitations to address the convention by G. N. Snider, formerly freight traffic manager of the New York Central Lines and now general manager of sales of Dickson & Eddy, New York; Owen Meredith Fox, associate editor of *Black Diamond*, Chicago, and E. M. Platt, president of the Platt & Brahm Coal Co., Chicago.

West Kentucky Strike Drones Along Peacefully

Everything is quiet in the western Kentucky strike zone. The operators are making no effort to run their mines and there have been no clashes of any sort since the men laid down their tools on the night of April 15. Operators are not anxious to run in the face of the present market. A long drawn-out strike is in prospect. If there were any possibility of a stiff demand or better price for coal some operators might be willing to consider signing up. On the other hand a good demand at a better price probably would result in a number trying to run open shop on the 1917 wage scale.

Alberta Looks for Troubles In Its Coal Mining

Alberta coal reserves, systems of coal mining, methods of grading and of inspection, cost of production and the capitalization of companies and their profits are to be investigated by a royal commission appointed by the Government of the Province of Alberta. It was decided upon as a result of a motion by P. M. Christopher, M.L.A., the labor member from Rocky Mountain, which received the support of Premier Herbert Greenfield and the endorsement of the Legislature.

Premier Greenfield, speaking to the motion, said that transportation costs are Alberta's chief difficulty in the search for an adequate market for coal products, but it is not the only problem. There is the cost of production, which varies from approximately $2.70 a ton, run of mine, at stripping steam coal mines west of Edmonton to $6.50 for lump at the deep domestic mines at Lethbridge. At Drumheller the cost is $4.50; at Edmonton, $4, and at the Crows Nest Pass, $4.25 a ton.

He said mine operators blame labor costs and the miners answer that because of intermittent employment they do not earn enough to keep their families in reasonable comfort. They argue that undue overhead costs and heavy capitalization of mining companies are important factors. The Premier thinks that something might be said for both points of view.

Discussing the capitalization of coal-mining companies in Alberta the Premier said that the total amount of securities issued by joint stock companies operating coal mines during the year 1921 was $45,209,058. The production in 1923 was only 6,866,923 tons.

Heavy Loss in Abandoned Mines

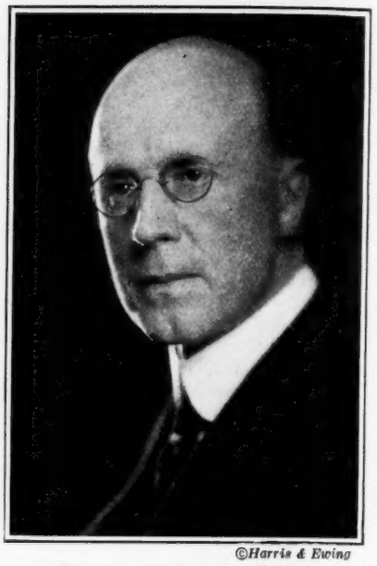
Toward the end of 1919 it was estimated that $18,795,755 had been invested in domestic mines in Alberta, of which $4,378,500 was invested in mines since abandoned. At the same date it was estimated that $18,315,000 had been invested in bituminous and anthracite mines, of which $5,435,000 had been invested in mines since abandoned. Thus there was a total of $9,813,500 sunk in abandoned mines.

In 1923 there were 362 mines operating in the province producing 6,866,923 tons, while in the Province of Nova Scotia 55 mines produced 6,500,000 tons. He maintained that high costs were due to some extent to the large number of small producing mines with the consequent multiplication of overhead and was of the opinion that this condition was the result of the ease with which leases of coal lands could be obtained under regulations of the Dominion Government.

Alberta had vast deposits of coal, it was said, but this was no excuse for wasteful methods of mining. He said that from 1905 to 1919 there had been blocked out for mining 102,603,927 tons, of which 54,379,081 tons had been extracted. Of the 48,226,846 tons still unextracted approximately 20 per cent would be recovered. This meant that 43,000,000 tons was lost.

"This matter of waste," he said, "has been engaging the attention of the Dominion Government, which is seriously considering the institution of a system of inspection of mines and mining methods in the interests of conservation. In Great Britain the proportion of coal salvaged is around 85 to 90 per cent. In Alberta the opinion of competent engineers is that the proportion salvaged is around 60 per cent all over the province."

Premier Greenfield closed with the statement that the Province of Alberta is negotiating with the Dominion for full control of her natural resources and that the Province has been endeavoring, in anticipation of the successful outcome of these negotiations, to obtain the fullest possible information regarding these resources.



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Senator Tasker L. Oddie

The Nevada Senator continues to advocate the creation of a department of mines and is at work on amendments to his bill which would apply to the coal industry. The new sections will provide for the appointment of advisory committees and the establishment of a bureau of coal economics.

To Study Mechanical Loading

A proposition is now before Director Bain which involves a study of mechanical loading by a fellowship research under the direction of the U. S. Bureau of Mines assisted by the Carnegie Institute of Technology, Pittsburgh, Pa. The Hillman Coal Co., Pittsburgh, offers to pay the way of a fellow to participate in the research; the Bureau is asked to furnish the services of an assistant mining engineer who will lead the work.

If the proposal receives the approval of the authorities in Washington—and most likely it will—the two men chosen for the work will go from mine to mine where mechanical loaders are used, observing performances and studying operating conditions. After an investigation of ten months, which will take them to all states mining coal, they will write a report of their findings and suggest methods and mine layouts for loading coal from the Pittsburgh seam with machines.

More Than 100 Meet Death in Explosion In West Virginia Mine

Dispatch from Staff Correspondent

A violent explosion, in which, at the time this report was forwarded to *Coal Age*, 110 men were believed to have lost their lives, occurred at about 7:15 on the morning of April 28 in the Benwood mine of the Wheeling Steel Corporation, Benwood, W. Va., on the outskirts of Wheeling's industrial zone. The full force of men was at work, the man trip having entered the mine at 6:30 a.m.

The mine is a drift in the Pittsburgh No. 8 seam, from which about 900 tons are mined daily. It is very dry and is sprinkled daily in dry seasons. Few or no pumps are required in its operation. Open lights are used exclusively because the mine was never believed to be dangerous. The occasional pockets of gas found here, as also in most of the mines of the district, were never believed to make necessary any precaution other than ventilation and the regular inspection by firebosses.

The rescue crews are being hindered in their work by roof falls and deadly gases. About 1,400 ft. inside the drift mouth a big fall obstructs the entrance of rescuers. Consequently the base of operations is at the Browns Run airshaft. This shaft, which was sunk to facilitate ventilation, has been completed about five weeks. So far only thirty bodies have been recovered and little hope is entertained for the safety of the others. The ventilating fan was undamaged and is delivering 40,000 ft. of air per minute.

About three months ago a fireboss and two men were killed in this mine by the ignition of a pocket of gas. The cause of the explosion probably is, as usual, the ignition of an accumulation of gas and the extension of the explosion by coal dust. Federal Mine Bureau crews and those of the state and company are at the mine rendering assistance. Little progress has been made and consequently little is known regarding the condition of the workings.

Benwood mine adjoins several thousand acres of old abandoned workings. Probably much firedamp comes from these areas as a result of the destruction of stoppings and seals. While Pennsylvania state mine inspectors were in session in Pittsburgh discussing the advisability of rock dusting, rescue crews were at work in the Benwood mine searching for the bodies of men who had lost their lives in a coal-dust explosion.

North American Co. Pays $4,900,000 for St. Bernard Mines

The North American Co., of New York closed an option April 26 on all the properties of the St. Bernard Mining Co. for $4,900,000, according to advices from Madisonville, Ky. The new company will be merged with the West Kentucky Coal Co. under the latter name, and will be capitalized at $15,000,000, of which $6,000,000 is in preferred stock and $9,000,000 common stock.

The new company will operate twenty-five mines, ten of them West Kentucky Coal Co. properties, with an annual output of 5,000,000 tons. The North American Co. controls the West Kentucky Coal Company, which is an organization with headquarters at Sturgis, where it operates coal mines as well as at Clay and Wheatcroft.

Negotiations for the consolidation have been in progress since January. C. F. Richardson, of Sturgis, president of the West Kentucky Coal Co., acted for the purchasers. The St. Bernard company was represented by F. D. Rash, Madisonville, president; J. R. Rash and M. K. Gordon, both of Madisonville, and Eustice A. Haile, of Nashville, Tenn.

An announcement from Madisonville was to the effect that there would be no change in the officers, personnel, policy or name of the St. Bernard Mining Co. It will operate, the announcement said, just as it has in the past and added that stock control is the only change in the ownership. Officials of the North American Co. in New York City declined to make a statement.

Included in the deal are thirteen pit and strip plants, 44,000 acres of mineral rights, most of it timber land, all of the commissaries and tenant houses and the electric power plant at Earlington, which cost between $740,000 and $1,000,000.

Horrors! Bossy Competes With Coal Now!

The Rock Island R.R. has been mining its engine fuel from coal mines and oil wells mostly. But the other day it mined two tons from a dairy herd near Chicago and ran a five-car passenger train 20 miles on it. The fuel on the tender was dried and briquetted milk in white chunks fired from the tender by a hard-boiled fireman with a regular scoop into a regular firebox. And it made a fire so hot that the engine popped off most of the time—for the benefit of movie cameras and lots of spectators. The milk-fired run was engineered by the Chicago Health Department as a stunt to illustrate the fact that milk is such good fuel for human bodies that it will even run an engine. Since the famous milk run the Health Department has been trying to get Chicago to consume more good milk and the Rock Island has been trying to get the "goo" out of the flues of that engine.

House Committee Agrees to Defer Sec. 28 a Year

The House Committee on Merchant Marine recommended on April 26 that the operation of Sec. 28 of the Merchant Marine Act be deferred until May 1, 1925, and ordered a favorable report on the bill introduced April 12 by Representative Newton, of Minnesota. As originally drawn the bill would have postponed the effective date of the section until July 1 of next year.

Members of Congress believe that there is a chance for the Newton bill to be passed by June, and it is to be speeded. Mr. Newton said that he would ask for a special rule to give his measure preferential status. He will see Chairman Snell, of New York, chairman of the Rules Committee, this week.

Saturday's action was the result of protests from commercial interests in all sections of the country, who sent their representatives to go before members of Congress, the Interstate Commerce Commission and the Shipping Board. They declared that if Sec. 28 went into effect on May 20, as proposed under the order, it would demoralize the nation's industry, and in the terms of some of the witnesses, "make and unmake ports and industries."

The Interstate Commerce Commission decided, after a hearing, to postpone operation of Sec. 28 for thirty days, or until June 20, because the evidence showed that the railroads could not be ready by May 20 to put into effect the new preferential railroad rates on goods shipped for export on Shipping Board vessels, as proposed under Sec. 28.

Miners Oppose Concessions In Ohio Mines

A referendum of the miners in the southern Ohio field in the employ of operators connected with the Southern Ohio Coal Exchange, indicates, according to preliminary reports, that the miners are opposed to any concessions. When the scale in force during the past few years was affirmed for three years more as a result of the joint conference of operators and miners at conference at Jacksonville, Fla., it was understood that concessions in working rules might be made by which Ohio operators would get an advantage of 25c. to 50c. a ton, giving them much leeway in meeting competition of non-union mines in West Virginia and Kentucky. The exact status of the situation will not be known until the referendum vote is completed. The referendum vote is said to be very light.

A strike of a week's duration in the mines of the Pennsylvania Coal & Coke Corporation in Ehrenfeld, Cambria County, has been settled and the miners have returned to work. The trouble arose over the announced intention of the company of putting a night force to work in the mines. This the miners refused to sanction as not in keeping with the recently signed agreement. James Mark, vice-president of District No. 2, succeeded in adjusting the dispute.

Problems In Underground Management

Advice on Best Methods of Shooting Coal

Air Spaces Should Be Left to Spare the Roof and Cushion the Blow on the Coal—Shearing Sometimes Undesirable

IF ASKED what is the best explosive for coal mining I should be tempted to evade the question for want of detailed conditions, or else answer in a general way, that it is the explosive producing the results desired. The quantity and the size of coal produced is not dependent alone upon the kind of explosive. There are many other governing factors, such as the kind of coal, the depth of undercut, overcut or shear, the depth of the borehole, the quantity of explosive used and the tamping. Trials and tests will determine the best explosive and the best mining practice in any given mine.

Good Tamping Affords Safety

The only factor which is not variable is that of tamping. There is only one best method and that is to use stemming material which will pack solid, such as damp clay, and then tamp it tight right to the collar. Inflammable material such as "bug dust," paper or sawdust is banned. Good tamping not only provides safety in dusty and gassy mines, minimum of fumes and more efficiency from the explosive, but it also enables the powder to bring down a maximum percentage of the coal in desirable sizes.

The miner who uses a cheap explosive to save a few cents or who cuts fuse short to save a penny or two, or who to save a few minutes does not tamp a borehole is practicing a false economy. He saves about as much as the Hickville carpenter who spends an hour each day straightening bent nails to save buying new ones.

Slow Powder for Brittle Coal

In both bituminous and anthracite coal beds the quality of coal varies considerably. Some coals are hard and tough, and others are brittle. Even in the same mine the changing character of the coal sometimes necessitates different methods of operation. If a coal is easily broken, that is, brittle, a quick-acting explosive should not be used, as this will tend to shatter the coal and break it up into the smaller and less desirable sizes.

This is one of the reasons why many miners prefer blasting powder to dynamite; even to selecting a coarse-grained powder which is slightly slower in its action than a powder of finer grain. Large lumps of bituminous coal as a rule cannot be obtained with the quicker-acting explosives. The velocity of detonation for an explosive suitable for producing bituminous lump may run up to 8,000 or 9,000 feet per second, but for anthracite, explosives having higher velocities of detonation will work satisfactorily.

Undercutting, overcutting or shearing the coal helps materially in producing lump, and the extra face so reduces the resistance to breakage that much less explosive is required to bring down the same quantity of coal. Undercutting usually extends about 6 ft. deep from the face, but should be always a few inches deeper than the borehole. With proper undercutting, explosives are necessary to break the coal into lumps small enough for the miner to handle.

Mining to obtain large lump may be overdone as when an easily broken coal is both undercut and sheared. A weak, slow-acting explosive in this case would be likely to produce a few large blocks which would have to be broken up later to loadable sizes. But this method of shooting down the coal almost unbroken and breaking it up after it has fallen does the least damage to a weak roof.

Breaker Shot the Heaviest

The breaker shot, with undercutting, requires a heavier charge than subsequent shots. The first shot breaks against two free faces whereas subsequent shots are relieved by the extra face made by the breaker shot. If in a narrow bed the coal is sheared and the boreholes are placed midway between floor and roof, no extra free faces are obtained as each shot cleans out all the coal.

One of the Bureau of Mines requirements for a permissible explosive is that not over 1½ lb. (24 oz.) shall be used in any one charge. Tests in coal mines prove that this maximum charge suffices. A large number of tests show that the average loading is 14 oz. The depth of the borehole for coal mining runs from 4 to 6 ft. seldom exceeding the latter. The average depth of borehole over a series of tests was found to be 5 ft. 4 in. The average undercut with holes of this depth would be 6 ft.

The diameter of the borehole in general practice runs in sizes of 1¼ in., 1½ in., 1¾ in. and 2 in., the most popular diameter being 1½ in. With this size of hole, the average normal charge of 14 oz. (approximately two 1¼ x 8 in. cartridges) will occupy when the cartridges are slit and well tamped, 13 in. of the bore hole. This leaves 4 ft. 3 in. of tamping, which sufficiently confines the charge.

Although blasting powder is fast, being replaced by permissibles, it is still used in large quantities, principally on account of its lower cost and the force of long practice among miners who are adept at rolling a paper shell and filling it with just the right quantity of blasting powder. Under the same conditions of blasting as with permissibles these cartridges of black powder would occupy from 22 to 34 in. of the borehole leaving only from 3 ft. 6 in. to 2 ft. 6 in. for stemming material, with a corresponding sacrifice of confinement. Laboratory tests made by the Bureau of Mines show that the more tamping used the greater the efficiency of the explosive, and they also show the superiority of moist clay over sand.

Miners are much more likely to over

Contributed by Atlas Powder Co.

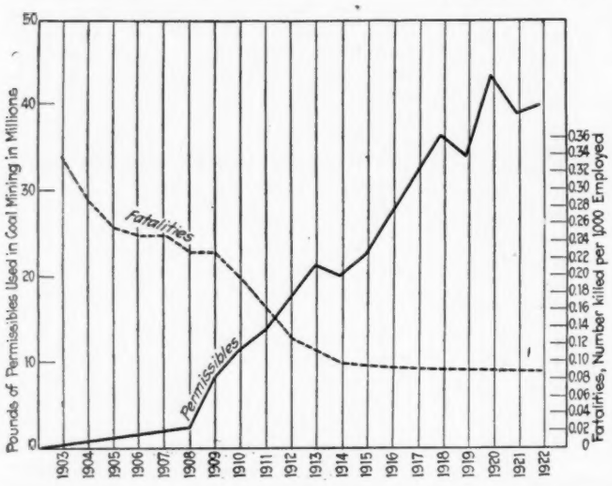


Fig 1.—The More Permissibles the Fewer the Fatalities

Chart shows how the death rate from explosives has decreased with increasing use of permissibles. The fatality rate, however, since 1914 fallen but little, though the use of permissibles has greatly increased, suggesting that other causes tended from 1903 to 1914 to reduce fatalities from explosives.

charge a borehole than undercharge it. They know that an insufficient charge especially of blasting powder, will blow out of the hole much as a bullet is fired from a gun, bringing down little coal, if any, and resulting in a waste of powder and time. Miners who have changed from blasting powder to permissibles almost invariably overcharge the holes.

When a charge of over 24 oz. of any powder is used it ceases to be a "permissible" and outside of the fact that such overcharges become dangerous in gassy and dusty mines, they also have a tendency to weaken the roof. Overloading may develop fissures in a roof which are not immediately noticeable to the miner but which may later cause a fall of roof. If the coal will come down only by heavy charges then it is better to decrease the quantity of explosive in each hole and increase the number of holes in the face.

Permissible explosives being stronger and quicker than blasting powder, their action is more centralized at the bottom of the borehole. If this hole is drilled slanting upward or "pitching" and so that the bottom of the borehole comes just under the roof a dense explosive is liable to do more damage to the roof than a bulky one, because with the latter the force will be exerted over a greater length of borehole. Hence the user of permissibles will often find the bulky powders the more satisfactory.

Air Cushions Advisable

In some coals it is found that the charge shatters excessively. This has led to the practice of leaving an air cushion around the powder. If permissibles are used the cartridges are placed in the borehole without being slit. The borehole, being of larger diameter than the cartridge, leaves the necessary air space. With blasting powder a space of a few inches is left at the end of the charge by inserting a wad of paper the desired distance from the end of the charge and then following with the stemming material. With the development of permissibles the use of an air cushion is becoming obsolete.

After all is said and done the best way to determine the proper explosive is to ask the service department of the explosive manufacturer to send an expert to demonstrate in the mine. In this way the best mining practice and the best explosive for that particular mine can readily be determined.

Fig. 1 shows graphically the trend of practice with respect to the use of permissibles, and the relation of such practice to coal-mine fatalities. It will be seen that since the introduction of permissibles and their constantly increasing use the number of fatalities in coal mines due to explosives has been constantly decreasing. Every year there is a greater proportion of permissibles used as is shown graphically in Fig. 2.

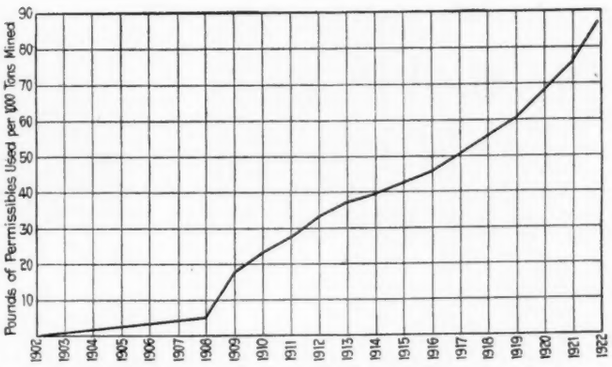


Fig. 2—Pounds of Permissibles Used per Thousand Tons Mined

This chart is based on the yearly sales of permissibles and the entire production of coal. It must be remembered that it does not indicate in any way the quantity of coal broken down by any given quantity of permissible explosive.

Twists Props Loose Instead Of Pulling Them

When Henry Walker, deputy chief mine inspector of Great Britain, addressed a meeting of anthracite coal men at Scranton he said that in England the modern way of loosening and recovering props was by twisting them loose and then pulling them out.

Consequently the description of the "Wrester" prop-drawing device contained in the *Iron & Coal Trades Review* recently is of interest. Where the prop is set firmly it may resist pulling and another setting of the post puller may have to be made. When this is being done the man has to return to the place of danger, which has been rendered still more dangerous by the attempt to withdraw the prop.

At the Sneyd collieries, Burslem, sixty, "Wresters" are being used. As will be seen in Fig. 1 the device consists of the lever *A* which turns on the fulcrum pin *B*, within the jaw of the collar *C*,

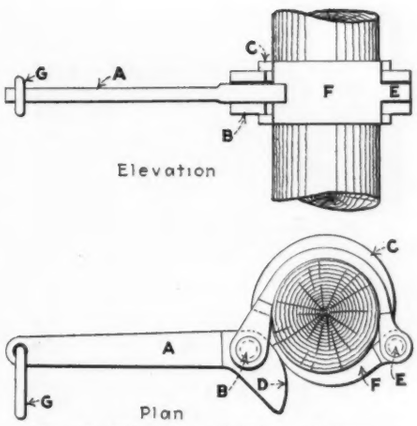


Fig. 1—Twisting Collar and Lever

The teeth in the curved member *F* bite into the prop when the lever end *D* presses on it as a result of the pull on the link *G*. Nothing is said as to the possibility of pulling the prop where it is of irregular form such as is usual in this country where props are frequently made of split timber.

which it will be seen is adapted to more or less encircle the prop to be withdrawn. The shorter arm of the level *D* is provided with a curved surface and the extremity of the lever is provided with a link *G*. The curved member *F* which is provided with teeth on its inner surface bite into the prop and prevent the collar from slipping when the link *G* is pulled. It will be observed that there are no loose parts to be lost or to get out of place.

In Fig. 2 can be seen the way in which the Wrester is operated from a distance. A chain is fastened to the link *G* and connected to a prop puller which is attached to a post at a distance from the one being pulled. Only one man is needed to put the Wrester and the prop puller in place. This same man pulls the prop.

The device is manufactured by the Atlas Mining Outfit Co. Ltd. of Birmingham, England. It is made in two sizes, one to draw 3½ to 5½ props and the other for props of a diameter of 5 to 7 in.

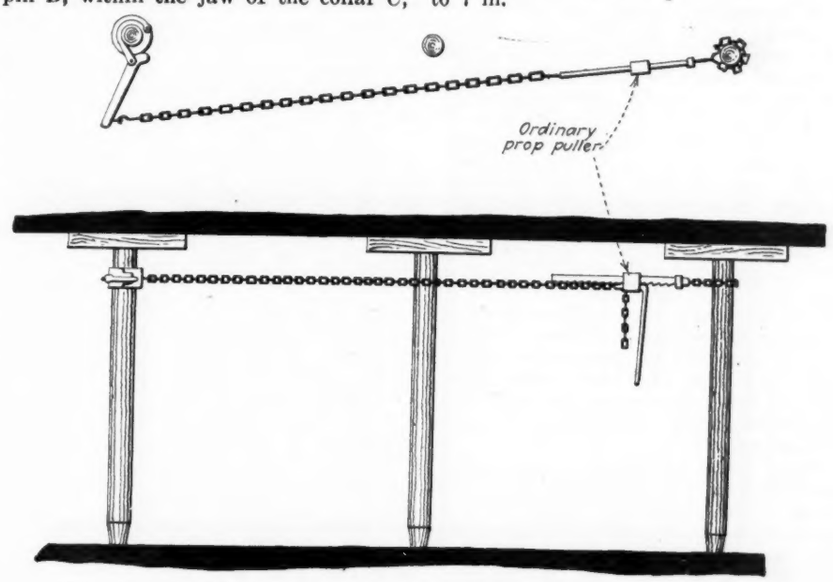
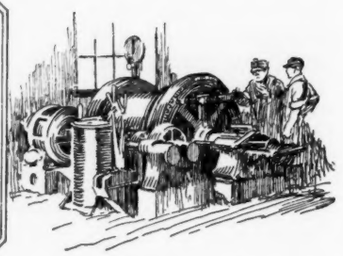


Fig. 2—How the Prop Is Twisted and Withdrawn from a Distance

With this device there is a leverage that makes pulling easier. Several props can be withdrawn without changing the anchorage. In a demonstration one prop was drawn that had no cap piece but was bedded in the roof. The props are not injured, it is said by this novel method of freeing and drawing them.

Practical Pointers For Electrical And Mechanical Men



What Means Should Be Taken to Keep Mine Locomotives Equal to Their Work

Switch in Series Position, Haul in Parallel—Run on Resistance Points No More than Necessary—False Flanges Cause Vibration And Destroy Switches and Crossovers

A MINE locomotive is a rugged piece of equipment, but like all machinery, it requires care, repair and intelligent operation. The average man can operate a mine locomotive successfully if he uses common sense and follows the instructions of the electrician. The motorman should know the track on his run and should be well acquainted with the mine. He is usually directly under the supervision of the trip foreman or of the mine foreman, but he should endeavor to follow the instructions of the electrician in operating his locomotive.

He should keep it oiled and greased, unless there is someone employed to do that work, and I believe it is the best practice to have a man for this purpose if there are many motors. The motorman should report to the repairman any defect that he has observed in the operation of the motor. All motormen should know that track switching should be done with the reverse handle in the series position and haulage with the handle in the parallel position.

Sand Should Be Used Sparingly

A locomotive should not be run on resistance points any more than necessary because such operation heats the grids and causes burnouts and grounds. The controller handle should be moved to a full point or notch every time it is moved because if stopped between the notches on the star wheel the segments and contact fingers will be burned. Sand should not be used any more than necessary. If used sparingly the locomotive will pull more cars. I have known of cases where a locomotive was insulated from the track by use of too much sand. This, however, does not happen often. When it does, it is a good idea to remove the trolley pole from the wire and make some kind of temporary connection with the rail before again attempting to move the locomotive.

Some coal companies require the motorman to blow the coal, dust and trash off the lids and frame of the locomotive at the end of each shift. This is good practive, but it seems that the motorman should not be the man required to do this work because it can be done to better advantage by a repairman.

A mine that has a number of locomotives usually has a force of repairmen for the upkeep of the traction equipment. Also a shop either inside or outside the mine, according to the ideas of the management and whether it is a shaft or a drift mine. Of course repairs can be more effectively made by daylight, but that does not mean that equipment cannot be successfully repaired inside the mines. There is one difficulty, however, and that is, securing material. The shop should have a pit or pits that will accommodate two or more locomotives and still leave room for a man to work with some degree of comfort. The pit should be about 4 ft. deep, and as wide as the track.

Shop Should Be Well Equipped

One or more chain blocks capable of lifting one end of the locomotive and a 2-ton chain block is handy for moving trucks, complete motors and other heavy parts. Screw or ratchet jacks should also be provided. Bars, chisels, sledges and the wrenches furnished by the locomotive manufacturer should be available. Slings made of steel or hemp and bands for handling the armatures should be provided. One or two extension cords with lamp guards are almost an absolute necessity.

The repair shop should be equipped with a compressed-air line. It should be roomy as possible and well lighted. A substantially built bench with a vise is also essential. Drawers and shelves for small supplies and for the mechanics' individual tools should be provided. Large tool boxes should be placed for the heavy tools or they eventually will be lost. Over the bench should be placed a test light with long leads or a portable test light can be provided. These lights offer the simplest means of testing for grounds, shorts and opens in the wiring of the motors. An emery wheel comes in handy but is not absolutely necessary. Of course ideal conditions cannot be attained around a mine but the nearer they are approached the better the repair service, and the fewer the delays. A shop should have tracks entering at each end, but sometimes this is not possible.

When a locomotive comes to the shop or barn it should be cleaned by means of moderate air pressure. Then while the lids are off, the motor should be given a thorough inspection; it should be scrutinized closely for loose nuts, bolts, or screws. The wiring should be examined where it leaves the conduit, where it enters the motors and controller cases to see if the bushings are worn or lost and to see whether the insulation on the wire is worn.

Any lost or worn bushings should be replaced, and the wire taped with insulating tape at worn places. If the strands of wire have been broken or burned by grounding it is advisable to either splice in a new piece or replace the whole length. Sometimes a wire which has been cut or burned can be repaired by a screw or soldered connector.

See That Brakes Are Adjusted

The brake mechanism should be carefully inspected to see if the shoes line with the treads and that the pins and keys are in place. If shoes are worn they should be adjusted or replaced. The brake screw should be run up tight and then loosened to see if the mechanism binds and to ascertain the available take up of the brake screw. The brake studs should be examined to see if they are loose. If the brakes do not set up tight they can be adjusted by the adjusting rod or turnbuckle.

The journal boxes should be packed with wool waste and the bearings filled with engine oil, unless some special oil is specified. Both should be of good quality. Black oil is not suitable for anything but track switches and guard rails. A journal should not be allowed to wear too thin as a jar will cause it either to split or break, depending upon its composition. If any of the lids are gone from the axle journal boxes they should be replaced.

The adjusting collar on the drive axle should be set so that the pinion has about $\frac{1}{16}$ in. endwise play to insure a smooth, even wear of pinion and gear teeth. The pressed-on type of gear gives less trouble, but many good split gears are on the market. A false-flanged wheel should not be allowed on a locomotive as it not only causes excessive vibration to the equipment, but damages switches and crossovers. Flat spots on the treads should be ground down, whether caused by sliding or soft spots in the metal.

The motor suspension should be examined, gear cases aligned and tightened and any holes patched. The grease cups on armature bearings should be filled with a good quality grease. Practically all mine equipment now has either roller or ball bearings, which do not give as much trouble as sleeve bearings. All nuts and bolts on the motor case should be kept tight

and fastened with cotter keys. The motor cases are of two types, box and split frame. Both have their advantages and disadvantages, but of the two the split frame is easier for armature or field changing, more especially when a defective field is in the top half of the motor frame. The sand levers and valves should be kept in good condition. On straight track the sand spouts should line with the wheels. I have heard many persons theorize on the subject claiming that the sand rigging working on one side and not on the other was the direct cause of axles being twisted in two.

The trolley base should swivel freely, and on straight track the wheel should align with the wire. If there are no abnormal conditions the trolley should not arc on straight track. The terminal screws should be tight and the pole cable in good condition. Insulating straps of rubber or leather are a good means for holding the cable tightly against the pole. I have seen tape used for this purpose but believe it is a wasteful practice.

Backpoling Is Dangerous

Poles should be of a soft wood which will split easily, because nearly all motormen occasionally backpole and a hard, unyielding pole is more dangerous than one of soft wood. Backpoling is a dangerous practice and should not be allowed. I have put on as many as three poles in one night, all broken by motormen who persisted in that practice. The cable socket should be carefully lubricated and examined to see that its contacts are not burned or pitted.

I know of one case where a pole caught in a frog and was jerked out of the pole socket. Instead of the cable pulling out of its socket it pulled the socket from its fastenings and jerked the motorman from his seat with the result that a trip of thirty cars passed over his body.

A locomotive repairman has a heavy responsibility. The controller which is always the brain of any electrical installation, when applied to mine locomotives is as simple as it can be made and still perform the necessary operations. It is substantially built of heavy contacts and arc protectors.

The more modern controllers have arcing tips that do not cost as much as the whole finger or segment. These can be renewed with a great saving in cost. Any accumulation of copper should be removed from the arc shields. The controller should be blown out with a moderate air pressure or a hand bellows and the contacts greased with commercial vaseline. Too much vaseline does more harm than good. The star wheel and the shaft bearings of both operating and reverse cylinders should be oiled occasionally.

The mine-locomotive motor is a product of years of study by the best mechanical and electrical engineers, and it is as well adapted to the mine conditions as any piece of machinery. Motors operated in the mines labor under disadvantages greater than in any other industry. Water holes, drippings from the roof, coal dust with carbon are present in nearly every mine. The motors have few ventilation ducts because if they did water would get to the windings. Of course this is offset to a great extent by ventilating fans on the armature shaft.

Inspect Motors Carefully

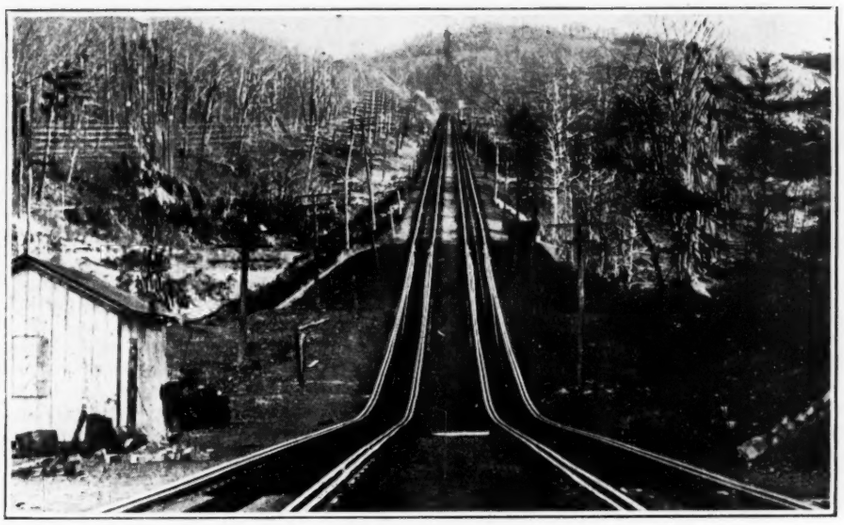
Locomotive motors are not where they can be easily inspected and in some cases they operate almost continuously. In many mines the return circuit from the locomotives is bad and this causes the motors to heat abnormally. Motors should be carefully inspected for rough commutator, worn brushes, burned pigtails or shunts, high bars and open circuits. The brushes should be free in the holders and the holders tight on the rigging. The tension should not be too loose, a pressure of about 4 to 6 lb. per sq.in. being good practice.

If a motor shows abnormal heating it should be thoroughly tested for grounds and defective fields. Imperfect bonding will cause the motors to heat. In a split frame motor the lead coming from the lower half should be carefully inspected to see that it does not get caught between the two halves of the frame and become damaged or grounded.

Last but not least the resistance banks should be examined for open circuits, grounds and burned or broken grids. All parts should be kept tight as loose grids cause burning which is the chief cause of grounds. If grids are loose they tend to chafe the mica-insulating tubes. Running the motors on the resistance points of the controller causes abnormal heating of the grids. Headlights must be kept in good condition at all times and the frame bolts, bumper bolts, etc., should be tightened at least once a week according to the service.

Grady H. Emerson.

Birmingham, Ala.



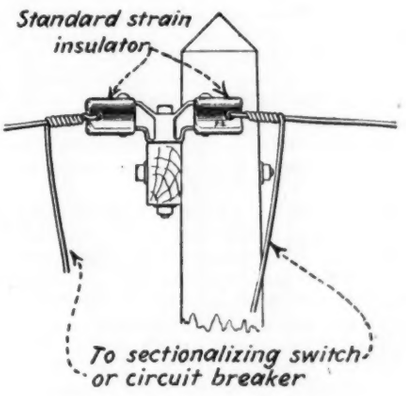
Ashley Planes Lift Coal at Low Cost

This is the longest railroad plane in the anthracite field and perhaps the longest in the world. A series of three planes nearly three miles long elevate coal cars over 1,000 ft. high from the valley near Wilkes-Barre, Pa., to the top of the mountain. The cost to elevate a ton of coal on these planes is 4c. With the best operating conditions it would cost 20c. to do this same work by means of a locomotive running over long winding tracks. More cars can be hauled up the planes in thirty minutes than the largest locomotive can pull up the tracks in twelve hours. The cables used on the planes are 2½ in. in diameter. These cables last from ten to seventeen months.

An Easy Method of Making Sectionalizing Taps

The small insulator and cross-arm fixture shown in the illustration demonstrates a convenient way to use standard strain insulators for taking off taps to sectionalizing switches on any kind of power, telephone, or signal circuit.

It is often convenient in such lines to have disconnecting switches that will sectionalize any troubles that may arise. When electricians are required to go over a line to locate trouble, it often is necessary for them to open up the circuits here and there and test in both directions for grounds and short circuits. The arrangement shown in the illustration is simple and consists of two standard porcelain insulators and a bracket which is attached to the cross-arm by a ⅝-in. bolt.



Strain Insulator Attachment Sectionalizes Line

Two wet-ware porcelain insulators and a bracket provide an easy method for taking off taps for the sectionalizing of switches or circuit breakers.

Discussion

Railroad Rates Set for All Tidewater Coal Not Subject to Section 28

So far as coal is concerned the one matter of interest in the order of the Interstate Commerce Commission putting Section 28 of the Merchant Marine Act in force is whether this order will prevent tidewater transshipment bituminous coal rates from being applied on bituminous coal exported in ships of foreign register sailing from North Atlantic ports.

It is very doubtful whether the order will have this effect on export bituminous coal, because the tidewater transshipment tariff rates in no way differentiate between coastwise or export, cargo or bunker, coal and are not predicated in any way upon the rates for water haulage beyond the railroad terminals.

The rates were established in the first place to permit the movement of water-borne bituminous coal into the New England markets, and the use of them on coal which has been exported has been entirely incidental and due solely to the fact that the rates have been published without any restrictions as to their use. They have not been based "in whole or in part" on the fact that any bituminous coal which may move on them is to be transported beyond the railroad in foreign water-borne commerce.

From 1896 to 1924, the total bituminous coal transshipped at tidewater at the North Atlantic ports grew steadily from eight million to twenty-eight million gross tons, and the New England tonnage grew from four million to twelve million. Meanwhile the export coal which totalled only one-half million in 1896 amounted to only four and one-half million in 1924.

General Manager, G. N. SNIDER.
Dickson & Eddy.

Lots Should Be Drawn for Working Places

I read with interest the article by Alfred Jones, Wheeling, W. Va., in your issue of Jan. 3 entitled "Apportioning Working Places to Miners by Lot." Not only has this custom been in existence in the Durham mines for years, but it has regulated the distribution of working places throughout the whole of Australia, and New Zealand. I spent nearly seven pears in Australia as a mine manager, and the system works works satisfactorily.

The practice is as follows: Eight days before the cavil is to be drawn the pitboss numbers all the places. The day before the cavil the pitboss and two miners appointed by the men inspect all places to be allotted. When the day arrives the same two men, with their checkweighman, the pitboss, mine manager and one of the office clerks, meet in the office to draw the cavil. All the men select their partners and hand their names to the checkweighman, who hands them over to the mine manager.

The names are all written off in pairs and put into a hat with little balls all numbered to correspond to the numbers of the places in the mine. After shaking, the hat is held above the heads of those present and drawing starts. One of the miners draws a ball and notes the number, say 36. The pitboss then draws a paper with the names on it, say J. Jones and R. Stewart. These names are put down to place No. 36, and so on. The names and the ball No. 36 are put aside and drawing continues.

When the drawing is finished the clerk has the completed list with the names and numbers, and this is posted at the office where the men can see the numbers of the places they have drawn, and in the morning they know just where to move their tools, so that little time is lost in moving.

The miners clean off all their places the day of the cavil. In the place thus selected the miner works for three months when another cavil is held. The foreman cannot take the room away from him. If the foreman stops the place to get rid of the man it must stand till the next general cavil. He may make a change, however, with the consent of the miners themselves, the pit committee and the manager. If there are any places finished during the cavil, the men displaced must be given other places. For this reason there are always a few rooms kept empty. Should two or three places finish the same day, the miners must cavil for the places to be awarded them.

JAMES GRAY.
Newcastle, Wash.

Banish the Hazardous Open-Flame Lamp

At a large number of mines in this country where a little gas is found and open lights are used, firebosses are employed as a precaution, who examine the mine before the men enter and while they are at work. This plan is recognized as safe in some of our leading coal-producing states. The mystery of it all is that it has proved inadequate in so many instances and yet continues to be recognized as the best we can do. Recent explosions have proved to us again and again that a little gas now and then is a real menace and may be at any time the cause of the death of a few or a thousand men. When a few men are killed where hundreds are employed it is not due as a rule to any precautions taken by the management.

The lesson to be learned from the recent explosions are first that the use of open lights in a mine requiring firebosses is a dangerous practice and that fencing and posting signs will not save us from disastrous explosions when working around falls and where there is a squeeze. Particularly is this true where the squeeze becomes so dangerous that fireboss' examinations cannot be made to warn the workmen of the true situation.

GEORGE EDWARDS.
Pikeville, Ky.

Many Peculiar Mine Names Near Portage

Answering the challenge in the issue of *Coal Age* of Dec. 27, p. 968, I present the following odd names for coal-mining plants: Starting at the foot of Martin's Branch of the Pennsylvania R.R. Co., running out of Portage, Pa., we have the following collection of ordinary and extraordinary names, given in the order of their occurrence along the branch: "Miller Shaft," "Red Bird," "Jail Bird," "Big Apple," "Fiddler's Green," "Robin's Nest" (now idle), "White Elephant," "Puritan Shaft," "Pearces," "Wild Cat," "Penker." Then come the two Budapest mines, one known as "Buda" and the other "Pest"; "New Drift." "PeeWee's Nest," "Last Chance," "White Weazel" and "Rojohn."

They tell the story hereabout of a salesman who was hunting for a mine and asked a man on the tipple where the mine belonging to a certain company was. The man replied that he did not know. But the fact was the salesman was then standing on the tipple of the company he named and the mine was the one for which he was looking. A little thing like a company's proper name does not worry the men here, just so payday comes regularly.

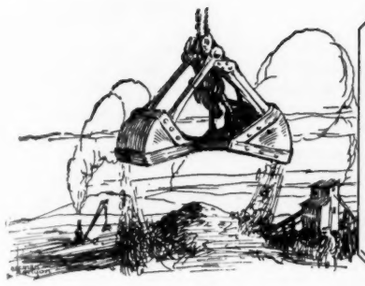
JEROME C. WHITE,
The Penker Coal Mining Co.
Portage, Pa.

Rock-Dust for Barriers from Cement Plants

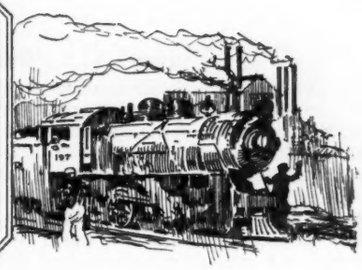
On page 231 of *Coal Age* for Feb. 14, 1924, I note an editorial under the title "A New Use of Trade Associations," referring to the possibility of a number of mines combining together in order to obtain a sufficient quantity of ground shale or limestone for use in dust barriers in the mine.

It may interest you to know that some years ago while endeavoring to introduce the use of rock-dust barriers in Oklahoma mines, I found that the local portland cement plant was grinding shale and limestone which could be used for such barriers. From the investigations which I made at that time I feel quite sure that any portland-cement plant can furnish the material for rock-dust barriers.

J. J. RUTLEDGE,
Chief Mining Engineer,
State of Maryland.



Production And the Market



Depression in Coal Markets Near End; Tendency Is Steadier, Undertone Hopeful

While there has been no pronounced recovery from the montonoous condition of dullness that has been prevalent in the bituminous coal markets it is probable that the bottom of the valley of depression has been reached. The Lake navigation season was ushered in last week with the arrival of three cargoes at the head of the lakes and several others are said to be on their way, but the movement is far from being under full headway. Operation at mines throughout the Central Competitive Field are at an exceedingly low ebb, production in the southern Ohio field being down to 10 per cent of capacity.

The consensus of sentiment seems to be that the trade is so flat on its back that the only direction in which it can look is upward. Though larger consumers for the most part still are averse to buying except for immediate requirements, contracts are being signed up here and there by railroads and industrials. The curtailment of output is having a steadying tendency, there being less glutting of markets with its inevitable accompaniment of distress coal. A number of producers and jobbers argue that many large users who have been living off their stockpiles will have eaten so deeply into their reserves soon that they will be forced into the market again.

Government to Encourage Early Buying

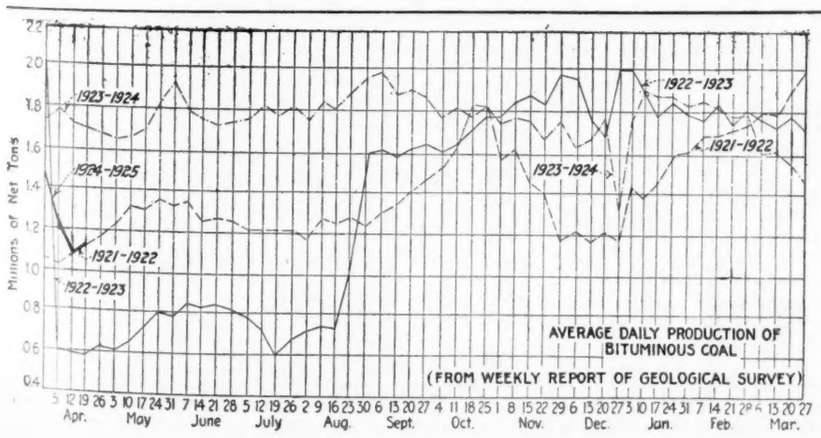
The Department of Commerce contemplates instituting in the near future a campaign to start domestic consumers of coal laying in stocks at this time. In announcing the plan last week the department stated that it is proposed to wait until domestic consumers have used up the remainder of their winter supplies and then show them that with the present favorable condition of transportation and the low price of coal, now is the propitious time to lay in supplies. Later on industrial consumers will be urged to place their orders for fuel, the scheme being designed to have one buying movement follow the other, in order to avoid traffic congestion and the possibility of undue effect on the market that might ensue if both classes of consumers began a concerted buying movement at the same time. The fact that the railroads had a surplus of 180,000 coal cars on April 14 is convincing proof that they are unusually well prepared right now for putting such a scheme into successful operation. All that is necessary to initiate the movement is some orders.

Coal Age Index of spot bituminous-coal prices registered a slight rebound during the last week, the April 28 figure being 171 and the corresponding price $2.07. This compares with $2.04 on April 21 and $2.71 a year ago.

Activity in the export field was less marked during the last week; nevertheless total coal shipments from Baltimore for foreign ports during the first twenty-four days of April were greater than for the full month of either January, February or March. Italy was the largest purchaser, with France second. Porto Rico has been a steady buyer in small quantities.

After a prolonged period of decline the production of bituminous coal recovered slightly during the week ended April 19 when, according to the Geological Survey, the output totaled 6,945,000 net tons, compared with 6,834,000 tons during the preceding week. Anthracite output was 1,623,000 net tons, a decline of 233,000 tons from the previous week.

Demand for anthracite is somewhat stronger, which with the lessened output has tended to make independent prices firmer on domestic sizes. This is attributed in part to end-of-the-month buying in anticipation of a possible advance in prices, as the cuts at the beginning of the month were announced as for April only.



Estimates of Production

(In Net Tons)

	1923	1924
BITUMINOUS		
April 5	9,629,000	6,826,000
April 12 (*a*)	10,401,000	6,834,000
April 19 (*b*)	10,221,000	6,945,000
Daily average	1,704,000	1,158,000
Cal. yr. to date (*c*)	166,933,000	155,632,000
Daily average to date	1,782,000	1,665,000
ANTHRACITE		
April 5	1,602,000	1,548,000
April 12	2,067,000	1,856,000
April 19	2,065,000	1,623,000
Cal. yr. to date	31,602,000	28,428,000
COKE		
April 12 (*a*)	421,000	265,000
April 19 (*b*)	436,000	254,000
Cal. yr. to date (*c*)	5,942,000	4,457,000

(*a*) Revised from last report. (*b*) Subject to revision. (*c*) Minus one day's production to equalize number of days in the two years.

Midwest at a Standstill

A practical standstill has been reached in the Midwest. The time of the year is about right for such a standstill, and the market conditions are at their worst for the time being. Stocks on hand in consumers' piles are disappearing, however, for most big buyers are confident coal will not be high at any time this year and are disposing of their storage fuel as swiftly as possible so as to enter the market about midsummer. A few small contracts are written day by day, but no heavy contracting is wound up.

Indiana and Illinois mines are working at low ebb—probably the lowest in history. The movement of large sizes is practically stopped and all mines have a certain number of "no bills" in those sizes, even though the mines may have been down for several weeks. Screenings continue in fair demand and light supply but without price changes from last week. Pocahontas is the only Eastern coal reaching the Midwest just now and that is coming in small volume at a mine run price declining from last week's spread of $2@$2.25. The May price may run under $2.

In southern Illinois fields a little railroad tonnage is moving and the strip mines are working fairly well. This seems to be principally on railroad coal. The mines continue to shut down until further advised and there is considerable dissatisfaction among the miners, who are hopeful that the west Kentucky strikers will win out and thereby give southern Illinois a better chance in the open market.

In the Mt. Olive district there is no change from last week, excepting in the matter of screenings, which are quoted at $2. In the Standard district it is hard to move anything, with the exception of screenings and small nut.

It is reported that the Rock Island contract was let at $1.78 for Standard mine run. The mines fortunate enough to run are getting one to two days a week and this is principally on railroad coal.

St. Louis domestic business is at a pause. The dealers are buying a little anthracite and that seems to be all. They all have a little coal in the yards that they are trying to clean up. Wagonload steam is easy and continues to ease off. Country domestic business is dead but there is some steam business, principally on screenings and small sizes.

West Kentucky Sells Some

As a result of the coal strike in the larger section of the western Kentucky field the mines in the unaffected sections, including non-union mines, independents, strips and union mines which have a year's contract still in effect, are getting a very fair business. The West Kentucky Coal Co.,

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Apr. 30 1923	Apr. 14 1924	Apr. 21 1924	Apr. 28 1924†
Smokeless lump	Columbus	$6.10	$3.35	$3.35	**$3.30@$3.50**
Smokeless mine run	Columbus	4.10	2.25	2.25	**2.20@2.35**
Smokeless screenings	Columbus	4.00	1.85	1.85	1.75@2.00
Smokeless lump	Chicago	6.10	3.10	3.10	3.00@3.25
Smokeless mine run	Chicago	3.85	2.10	2.10	2.00@2.25
Smokeless lump	Cincinnati	6.00	3.25	3.35	**3.50**
Smokeless mine run	Cincinnati	3.85	2.10	2.05	**2.00@2.25**
Smokeless screenings	Cincinnati	3.85	1.80	1.75	**1.75@2.00**
*Smokeless mine run	Boston	6.35	4.20	4.20	**4.40@4.50**
Clearfield mine run	Boston	2.60	2.05	2.00	**1.75@2.35**
Cambria mine run	Boston	3.35	2.55	2.50	2.25@2.75
Somerset mine run	Boston	3.00	2.35	2.15	**2.00@2.50**
Pool 1 (Navy Standard)	New York	4.00	2.85	2.85	2.75@3.00
Pool 1 (Navy Standard)	Philadelphia	4.05	3.00	3.00	2.75@3.25
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.10	2.20	2.20	2.00@2.40
Pool 9 (Super. Low Vol.)	Philadelphia	3.10	2.20	2.20	2.00@2.45
Pool 9 (Super. Low Vol.)	Baltimore	2.90	1.80	1.80	1.75@1.85
Pool 10 (H.Gr.Low Vol.)	New York	2.60	1.85	1.85	**1.75@2.00**
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.50	1.85	1.85	1.70@2.00
Pool 10 (H.Gr. Low Vol.)	Baltimore	2.50	1.65	1.65	1.60@1.75
Pool 11 (Low Vol.)	New York	2.25	1.60	1.50	1.40@1.65
Pool 11 (Low Vol.)	Philadelphia	2.10	1.50	1.50	1.30@1.70
Pool 11 (Low Vol.)	Baltimore	2.15	1.50	1.50	1.50
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.80	1.50	1.45	**1.40@1.65**
Pool 54-64 (Gas and St.)	Philadelphia	2.05	1.55	1.55	1.45@1.70
Pool 54-64 (Gas and St.)	Baltimore	1.95	1.60	1.60	1.50@1.70
Pittsburgh sc'd gas	Pittsburgh	2.85	2.40	2.40	2.30@2.50
Pittsburgh gas mine run	Pittsburgh	.....	2.25	2.10	2.00@2.25
Pittsburgh mine run (St.)	Pittsburgh	2.00	1.85	1.85	1.75@2.00
Pittsburgh slack (Gas)	Pittsburgh	1.60	1.30	1.30	**1.35@1.45**
Kanawha lump	Columbus	3.60	2.55	.....	‡
Kanawha mine run	Columbus	2.25	1.55	.....	‡
Kanawha screenings	Columbus	2.10	1.20	.....	‡
W. Va. lump	Cincinnati	3.75	2.35	2.25	**2.25@2.50**
W. Va. gas mine run	Cincinnati	2.40	1.30	1.30	**1.35@1.50**
W. Va. steam mine run	Cincinnati	2.40	1.30	1.30	**1.35@1.50**
W. Va. screenings	Cincinnati	2.25	1.05	1.00	**1.00@1.15**
Hocking lump	Columbus	2.85	2.45	2.40	**2.25@2.65**
Hocking mine run	Columbus	2.00	1.60	1.60	1.50@1.75
Hocking screenings	Columbus	1.70	1.30	1.30	1.25@1.40
Pitts. No. 8 lump	Cleveland	2.85	2.35	2.35	2.00@2.75
Pitts. No. 8 mine run	Cleveland	2.15	1.80	1.80	**1.80@1.85**
Pitts. No. 8 screenings	Cleveland	1.80	1.30	1.40	**1.50@1.55**

Midwest	Market Quoted	Apr. 30 1923	Apr. 14 1924	Apr. 21 1924	Apr. 28 1924†
Franklin, Ill. lump	Chicago	$3.65	$2.85	$2.75	$2.50@$3.00
Franklin, Ill. mine run	Chicago	3.10	2.35	2.35	2.25@2.50
Franklin, Ill. screenings	Chicago	1.85	2.15	2.15	2.10@2.25
Central, Ill. lump	Chicago	2.70	2.60	2.60	2.50@2.75
Central, Ill. mine run	Chicago	2.10	2.10	2.10	2.00@2.25
Central, Ill. screenings	Chicago	1.55	1.90	1.90	1.80@2.00
Ind. 4th Vein lump	Chicago	3.35	2.85	2.85	2.75@3.00
Ind. 4th Vein mine run	Chicago	2.85	2.35	2.35	2.25@2.50
Ind. 4th Vein screenings	Chicago	1.85	1.95	1.95	1.90@2.00
Ind. 5th Vein lump	Chicago	2.85	2.35	2.35	2.25@2.50
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@2.25
Ind. 5th Vein screenings	Chicago	1.55	1.80	1.80	1.75@1.85
Mt. Olive lump	St. Louis	.....	2.85	2.85	2.75@3.00
Mt. Olive mine run	St. Louis	.....	2.50	2.50	2.50
Mt. Olive screenings	St. Louis	.....	1.50	1.50	**2.00**
Standard lump	St. Louis	2.50	2.35	2.35	*2.00@2.35*
Standard mine run	St. Louis	1.85	1.95	1.95	1.90@2.00
Standard screenings	St. Louis	1.10	1.20	1.85	*1.75@1.90*
West Ky. lump	Louisville	2.60	2.25	2.25	**2.25@2.50**
West Ky. mine run	Louisville	1.95	1.70	1.60	1.50@1.75
West Ky. screenings	Louisville	1.85	1.60	1.60	**1.60@1.75**
West Ky. lump	Chicago	2.60	2.25	2.25	2.00@2.50
West Ky. mine run	Chicago	1.80	1.60	1.60	1.50@1.75
South and Southwest					
Big Seam lump	Birmingham	2.50	2.60	2.60	2.50@2.75
Big Seam mine run	Birmingham	2.10	2.00	2.00	1.75@2.25
Big Seam (washed)	Birmingham	2.35	2.20	2.20	2.00@2.40
S. E. Ky. lump	Chicago	3.75	2.25	2.25	2.00@2.50
S. E. Ky. mine run	Chicago	2.85	1.60	1.60	1.25@2.00
S. E. Ky. lump	Louisville	4.00	2.60	2.35	*2.00@2.25*
S. E. Ky. mine run	Louisville	2.75	1.60	1.50	1.25@1.75
S. E. Ky. screenings	Louisville	2.25	1.25	1.25	*1.00@1.25*
S. E. Ky. lump	Cincinnati	3.50	2.25	2.25	2.00@2.50
S. E. Ky. mine run	Cincinnati	2.25	1.25	1.30	**1.25@1.50**
S. E. Ky. screenings	Cincinnati	2.00	1.00	.90	**1.00@1.25**
Kanssa lump	Kansas City	3.85	4.50	4.50	4.50
Kansas mine run	Kansas City	3.25	3.25	3.25	3.25
Kansas screenings	Kansas City	2.60	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.

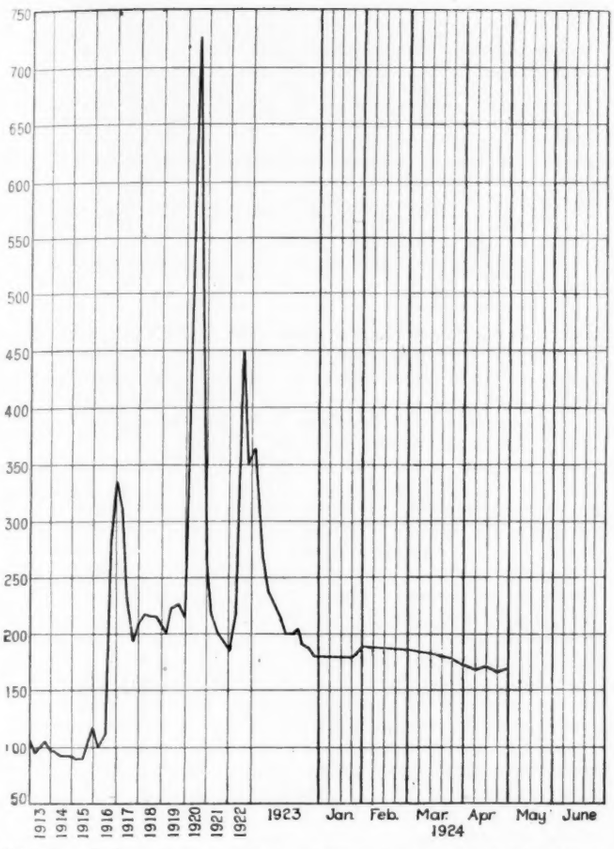
† Advances over previous week shown in **heavy type**, declines in *italics*

‡ Strike on.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	April 30, 1923 Independent	April 30, 1923 Company	April 21, 1924 Independent	April 21, 1924 Company	April 28, 1924† Independent	April 28, 1924† Company
Broken	New York	$2.34	.....	$7.75@$8.35	.....	$8.00@$8.65	.....	$8.00@$8.65
Broken	Philadelphia	2.39	.....	7.90@ 8.10	.....	8.50@ 8.65	.....	8.50@ 8.65
Egg	New York	2.34	$8.50@$11.00	8.00@ 8.35	$8.25@$8.65	8.25@ 8.65	**$8.35@$8.65**	8.25@ 8.65
Egg	Philadelphia	2.39	9.25@ 9.50	8.10@ 8.35	8.25@ 9.40	8.60@ 8.65	8.25@ 9.40	8.60@ 8.65
Egg	Chicago*	5.06	12.00@ 12.50	7.20@ 8.25	7.59@ 7.81	7.65@ 7.72	7.59@ 7.81	7.65@ 7.72
Stove	New York	2.34	8.50@ 11.00	8.00@ 8.35	8.25@ 9.00	8.25@ 8.85	**8.50@ 9.00**	8.25@ 8.85
Stove	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.60@ 9.50	8.65@ 8.85	8.60@ 9.50	8.65@ 8.85
Stove	Chicago*	5.06	12.00@ 12.50	7.35@ 8.25	7.90@ 8.03	7.81@ 8.03	7.90@ 8.03	7.81@ 8.03
Chestnut	New York	2.34	8.50@ 11.00	8.00@ 8.35	8.25@ 9.00	8.25@ 8.75	*8.25@ 8.75*	8.25@ 8.75
Chestnut	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.60@ 9.50	8.65@ 8.75	8.60@ 9.50	8.65@ 8.75
Chestnut	Chicago*	5.06	12.00@ 12.50	7.35@ 8.35	7.81@ 7.94	7.72@ 7.95	7.81@ 7.94	7.72@ 7.95
Range	New York	2.34	.....	8.30	.....	8.50	.....	8.50
Pea	New York	2.22	6.30@ 7.25	6.00@ 6.30	4.50@ 5.00	5.50@ 6.00	**4.50@ 5.25**	5.50@ 6.00
Pea	Philadelphia	2.14	7.00@ 7.25	6.15@ 6.20	5.25@ 6.50	6.00	5.25@ 6.50	6.00
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	5.13@ 5.36	5.36@ 5.55	5.13@ 5.36	5.36@ 5.55
Buckwheat No. 1	New York	2.22	2.25@ 3.50	3.50@ 4.15	2.25@ 2.75	3.00@ 3.15	2.25@ 2.75	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	3.00@ 3.50	3.50	2.75@ 3.00	3.00	2.75@ 3.00	3.00
Rice	New York	2.22	1.75@ 2.50	2.50	1.75@ 2.25	2.00@ 2.25	*1.75@ 2.00*	2.00@ 2.25
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.00@ 1.50	1.50	1.50@ 1.75	1.50	1.50@ 1.75	1.50
Barley	Philadelphia	2.14	1.15@ 1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	.....	1.60	.....	1.60	.....	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	April 28	April 21	April 14	April 30
Index	171	169	172	224
Weighted average price	$2.07	$2.04	$2.08	$2.71

This diagram shows the relative, not the actual prices, on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

Sturgis, non-union, is able to load out a big tonnage, and is handling a good deal of coal just now. The strippers and other operating companies are enjoying the removal of competition from the mines that are down. Production of operating mines has been quite fair.

Movement is principally on mine run and screenings, there being light demand for prepared sizes, which is resulting in relatively small supplies of screenings being produced and a relatively high price. Screenings and mine run are both selling at $1.60@$1.75. Nut coal is $2@$2.25, and all other sizes, $2.25@$2.50, including egg, lump and 6-in. block.

Louisville jobbers and producers of coal report that demand is generally quiet. The strike in western Kentucky has resulted in better movement of eastern Kentucky screenings into Louisville, there being a difference in price sufficient to absorb the 43 to 53c. higher freight rate from eastern Kentucky. Eastern Kentucky screenings are selling at $1@$1.25, as against $1.60@$1.75 for western Kentucky.

Little Action in Northwest

Navigation opened on Tuesday of last week with three cargoes received at Duluth-Superior. The Northwestern Fuel Co. got the first cargo at its Superior (Wis.) dock and the Inland Fuel Co. received two cargoes about half an hour later. Several more cargoes are reported on the way from the Sault, and it is thought that before the week is out all docks will have received coal.

Great rejoicing is evident among dock men at the recent decision of the Interstate Commerce Commission raising the hard-coal rate from mines to Twin Cities $1.05 on net and $1.16 on gross tons. This brings the freight back to $8.50 again, which will allow the docks to compete not only in Twin Cities but also in North Dakota and similar states. The new decision may see a resumption in anthracite activity, which will mean that the usual tonnage will be brought up this year.

Prices are the same in anthracite as last reported, and the list in bituminous is holding, but several docks are reported to be cutting 25c. a ton lump Youghiogheny, Hocking and splint for spot delivery. The docks are not contracting ahead at present prices, as they assert that coal costs them $5 laid down here, without local dock charges. On the other hand, buyers are in the market for nothing but spot coal, and are not interested in contracts. They look for another drop. Consequently everything is lovely. A little more coal is moving to public-utility plants and open-pit iron mines, because of the absolute failure of water supply. The situation is unprecedented.

With new coal being unloaded onto fairly well filled docks and with almost a total lack of demand, the coal situation at Milwaukee at present is exceedingly dull and unpromising. The only feature of the market worth noting is the tightness of soft-coal screenings. April coal arrivals by lake thus far aggregate 10,000 tons of anthracite and 22,975 tons of soft coal. A number of additional cargoes are on the way.

West Is Quiet Too

The Kansas City market remains quiet. Little progress has been made in the joint conference of scale committees of operators and United Mine Workers. Such Kansas coal as is available, most of it the product of mines independent of the Southwestern Interstate Coal Operators' Association, is quoted at $4.50 for lump, $4 for nut, $3.25 for mine run and $2.50 for slack. Henryetta (Okla.) coal is $5.50, $3.75, $3.50, and $2.50.

The coal market in Colorado remains practically the same as last week inasmuch as the mines worked on an average of twenty-three hours per mine for the week. A number of unbilled loads of domestic sizes were reported on track last week. Operators report 35 per cent of the working time lost last week on account of "no market." Prices are unchanged.

In Utah the coal business is referred to by operators and retailers as "Rotten!" Mines are working around two days a week. Industries are buying very little and the domestic consumption has fallen off as a result of the ideal spring weather which prevails. The slack situation is easier due to a falling off in demand. The chief coal railroad in the state has written the operators using its line begging them not to load any more "no bills." Mine prices have taken another drop, but retail prices remain firm. The new mine prices are : Lump, $3.50; domestic lump, $3; stove, $2.75; egg, $2.50; nut, $2.25; screen slack, $2@$2.25; slack, $1.50.

Cincinnati Discerns Better Feeling

A much better feeling is evident below the surface in the Cincinnati market. Consigned and distressed coal has virtually been wiped off the slate. Practically all of the low-priced slack has been wiped out, run of mine quotations are firmer and even the makers of sized coal have caught the fever. Smokeless is even stronger than the others. Specialized coals are quoted as follows: Block, $2.75@$3.50; egg, $2@$2.75.

A slightly improved feeling is developing in the Columbus market. While prices have not advanced, the tone is stronger and operators and wholesalers believe that the worst of the slump is over. Some contracting of commercial tonnage is reported, but mostly on a tentative price basis. Railroad contracts have been attracting attention and several large agreements have been closed, it is reported, with the price of Hocking mine-run around $2. There is not nearly as much distress coal on the market. Retailers are cleaning up stocks and in doing so are often cutting prices. Retail prices are generally irregular. Pocahontas and some of the West Virginia grades are showing slightly more strength. Some inquiries have been made as to lake tonnage but no contracts of consequences have been entered into. Conditions are not favorable for an early opening of the lake trade. Uncertainty as to rates and other conditions are holding up contracts. Little tonnage from the Hocking Valley field is expected to be moved to the head of the lakes during the present season.

Production in the Southern Ohio field is settling down to

around 10 per cent or less of capacity. In the other Ohio fields a better output is reported, but it shows a falling off from the figures of previous years.

Operators and jobbers say that aside from inquiries for slack, there is no significant change in the lethargy which has held the Cleveland market in its grip since the latter part of March. There are reports of additional mines closing, and one large company operating seven or eight mines in the eastern Ohio field has closed all its mines except one. The smaller mines are practically all closed. Aside from some shipping by operators who have dock interests at the head of the Lakes, the shipping of coal from the mines to the lower Lake docks has not yet begun.

The market at Pittsburgh has sagged even further. There is practically no demand at all and prices in general are unchanged, save for a slight advance in slack. Line consumption is decreasing, the outlook being distinctly poor in the steel trade.

The situation at Buffalo does not change much. Though bituminous output is declining fast, it has not yet reached a level low enough to affect prices.

There is little activity in the soft coal market at Toronto. Pennsylvania smokeless is selling at $7.30, and steam lump at $7.40, delivered. Slack is rather scarce, and brings $6.40. The market for anthracite still continues firm, many people buying with a view to laying in a supply for next season.

New England Notes Firmer Tendency

In New England there are indications of firmer prices on the smokeless coals from West Virginia. Accumulations at Hampton Roads have steadily diminished until there is only a moderate tonnage on wheels in excess of orders in hand. Deliveries on contract are being made in reasonably good volume, and on the whole there is a slightly better tone to the market.

Buying, however, shows no improvement. The textile, shoe and machinery trades are still suffering from dull business, with prospects not favorable for the next few months. In the cloth trade there is depression due to competition from English mills, and large numbers of plants here are operating at a loss. Reserve stocks of coal are as large as early in the year, the "bargains" of the past few weeks having induced consumers to replace actual consumption, in many instances.

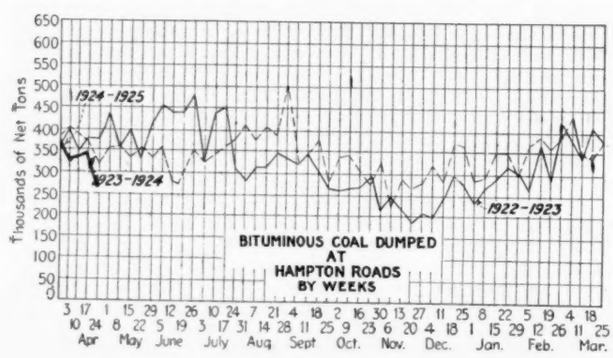
For distribution inland from Boston, Providence, and Portland there has also been an appreciable lift in spot prices. Quotations of $5.35@$5.50 per gross ton on cars have now lapsed, and the asking figure has advanced to $5.75@$6, with sales reported at $5.65@$5.85.

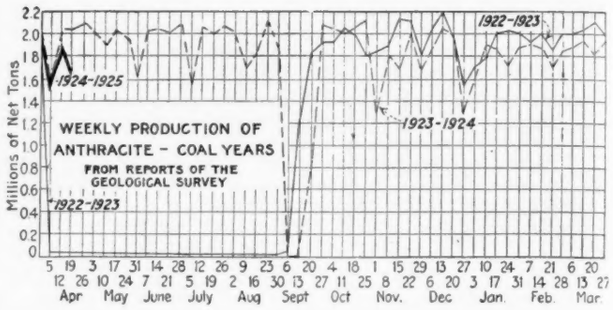
At Norfolk and Newport News the spot range has slowly advanced from $4.25 to $4.40 and $4.50 per gross ton, f.o.b. vessel for No. 1 Navy Standard Pocahontas and New River. No. 2 coals have advanced similarly from $4.10 to $4.25.

Meager Movement to Seaboard Markets

The lessened movement of coal to the New York market has served to maintain prices on about last week's level, for demand is still slack. Not much coal is being forced on the market unless the producer is compelled to get rid of it. Line demand continues dull but there was a trifle more activity at this tidewater. Loaded boats are gradually disappearing. Contractors continue to hold off for the most part and go into the open market to replenish their reserves.

Business in the Philadelphia market has slumped a little more. Conditions at the mines do not improve and there is


Thousands of Net Tons
1924-1925
1923-1924
1922-1923
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr May June July Aug Sept Oct. Nov. Dec. Jan. Feb. Mar.


Millions of Net Tons
1922-1923
1924-1925
1923-1924
WEEKLY PRODUCTION OF ANTHRACITE - COAL YEARS
FROM REPORTS OF THE GEOLOGICAL SURVEY
Apr May June July Aug Sept Oct Nov. Dec Jan. Feb. Mar.

more idleness now than actual work. Market prices manage to hold firm, but even at the present level there is not much stability, and there is no telling what price the consumer might get on a good sized block of coal. Of course a large share of the business is on lots of one to five cars and on these the prices have not changed.

In the face of the cut in soft-coal production there has been no material stiffening of the market at Baltimore. At present demand for both steam and gas coals is at a minimum and prices continue on the same low level maintained for the past few weeks.

General dulness continues to prevail throughout West Virginia, with such mines as are able to operate at all limited to about two days a week. Prices are so low that in some sections of the state at least producers are making no effort to operate unless they have contracts.

Although there has been little or no improvement in actual business in the Birmingham market, conditions in some respects are more healthy. There is little surplus coal, which has had a tendency to stabilize prices and remove under-cost selling to a great extent. Spot business is still light in volume and contracting is rather slow, though renewals are negotiated in most cases with the expiration of old agreements.

Anthracite Business Shows Firmness

Prices for independent domestic coals at New York are slightly firmer, demand having increased. Some of this increased activity was attributed to buying in anticipation of a 10c. advance by the producers. Stove coal continues to be the most popular size, though egg is in good demand in the New York market, call for this size showing much more action than a couple of weeks back. Chestnut size does not move as freely, but is in good demand. The past week has been a busy one for retail dealers. There was a little less activity in the steam coal market due to more seasonable weather, but not sufficient to show any surplus in any of the sizes.

Unusually cool April weather at Philadelphia has served to keep up a good current demand and business in a retail way is really good for this time of year. The Easter vacation of the miners has also had a strong effect on market conditions, and with the exception of nut coal, and the steam coal sizes, the operators are having very little trouble to move the output. The anthracite situation in Baltimore has resolved itself to a fairly settled basis. While some individual decisions may be made as to selling prices at retail, pending a more or less settled policy resulting from meetings of the coal exchange, it seems likely that the trade as a whole will continue the present schedule of prices at retail up until July 1.

Coke Market Dormant

The coke market continues practically stagnant, there being scarcely a ripple from sales or even inquiries. Output of beehive coke during the week ended April 19 was 254,000 net tons, according to the Geological Survey, compared with 265,000 tons during the previous week.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended April 12	881,299	127,792
Previous week	862,096	123,220
Same week in 1923	946,871	182,602

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
April 14, 1924	305,981	180,620	.....	.....
Previous week	278,724	159,438	551	.....
Same date in 1923	14,241	3,259	48,584	21,025

Foreign Market And Export News

British Prices Weaken with Waning of Strike Menace; Output Lower

Recovery from the usual holiday lull in the British coal market is gradual. With the waning of the strike menace prices are weaker in the South Wales trade and demand is slack.

The market at Newcastle also is weaker, and prices are declining. Present activity is entirely confined to filling orders booked some weeks ago.

A substantial increase in the German coal output, especially from the occupied district, in the last few months serves to aggravate the situation for British coal interests. The Ruhr is the key to the coal trade position today, the latter say, and the more coal produced by Germany the less will the leading Continental markets require from Great Britain.

A cable dispatch to *Coal Age* states that British coal mines produced 5,843,000 tons of coal during the week ended April 12, according to provisional official reports. This was a decline of 9,000 tons from the output of the preceding week.

The court of inquiry appointed to investigate wages and living conditions of coal miners has begun work. As the old contract expired April 17, the miners are working on a day-to-day arrangement pending the outcome of the inquiry.

Demand Keeps Pace with Output In French Markets

Demand for coal in the French markets is keeping pace with offerings, both in industrial and domestic fuels. Output is sold one month in advance; disposals are few and new business exceptional. The British market has been stronger due to the menace of a strike. Prices show a tendency to advance, as the demand is very strong.

With the continuance of cold weather, activity in the sale of household coal is holding above the level usually recorded at this time of the year. Owing to the rise of salaries and transport costs, dealers in the Paris area have decided not to alter their quotations during the month of April. It is probable, however, that summer prices will be applied in May, which will show a cut in quotations.

Output of coke during April is averaging about 19,400 tons daily, which is far in excess of that prevailing before the occupation. Owing to the recovery of the franc, the price for indemnity coke has been placed at 145.25 fr. on trucks frontier, Sierck, for the first two weeks of the month. To this will be added 0.50 fr. per ton, representing the expenses of administration of the O.R.C.A.

The rolling stock situation has improved slightly, but it is still far from normal.

Trade Slumps at Hampton Roads; Prices Rise as Supplies Fall

Business at Hampton Roads has slowed down, although prices are stiffening as result of reduced supplies at tidewater. Mines serving the port report shutdowns, due to overproduction, and the supply of coal on hand is dwindling.

Hampton Roads piers are running on part time, with indications that April will be one of the dullest months of the year. Foreign movement is fairly brisk, coastwise trade is dull and bunker business fair.

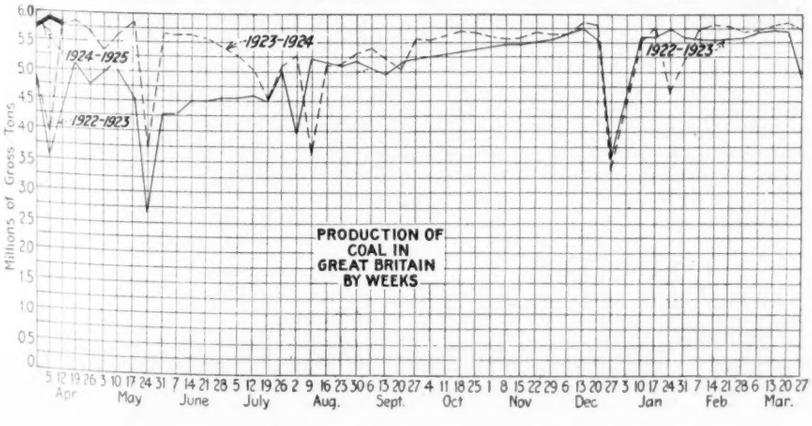
United States Domestic Coal Exports During March

(In Gross Tons)

	1923	1924
Anthracite	399,563	311,431
Value	$4,405,493	$3,303,127
Bituminous	1,219,970	1,111,752
Value	$7,880,657	$5,560,759
Coke	97,521	112,048
Value	$1,124,789	$516,733

British Coal Exports in March

	March, 1924	February, 1924	March, 1923
Tons	5,190,000	5,075,000	7,180,000
Value	£6,391,000	£6,201,000	$8,818,000



Export Clearances Week Ended April 25, 1924

FROM BALTIMORE

	Tons
For Algeria:	
Br. Str. Siltonhall	9,081
For France:	
Br. Str. Ikala	6,541
Br. Str. Saxilby	5,921
For Porto Rico:	
Am. Str. Gov. John Lin	765
Am. Schr. Jacob W. Hook	891
Am. Str. Delisle	815
For Italy:	
Ital. Str. Giovanni	9,913
Ital. Str. Giovanna Florio	7,353
Gk. Str. Michael L. Embiricos	7,675

FROM HAMPTON ROADS

For French West Africa:	
Ital. Str. Valtellina for Dakar	8,218
For Brazil:	
Amer. Str. Chincha Rio de Janeiro	8,214
Ital. Str. Emanuele Accame for Porto Ferrajo	11,228
Br. Str. Mabriton for Rio de Janeiro	8,833
For Bermuda:	
Amer. Schr. George W. Elzey, Jr., for Hamilton	1,010
For France:	
Fr. Str. P. L. M. 24 for Marseilles	7,935
Jap. Str. Spain Maru for Cherbourg	8,104
For Jamaica:	
Nor. Str. Gefion for Kingston	2,011
For Newfoundland:	
Br. Str. Hardanger	3,041
For Italy:	
Jap. Str. India Maru for Venice	7,807
For Uruguay:	
Nor. Str. Hesperos for Montevideo	6,505
For West Indies:	
Nor. Str. Bjornefjord for Curacao	5,499
Nor. Str. Halse for Port of Spain	3,028

FROM PHILADELPHIA

For Canada:	
Am. Str. Robert M. Thompson for Chicoutimi, Quebec	....
Am. Str. Ruby for Chicoutimi, Quebec	....

Hampton Roads Pier Situation

	April 17	April 24
N. & W. Piers, Lamberts Pt.:		
Cars on hand	1,473	1,617
Tons on hand	87,456	98,836
Tons dumped for week	118,343	106,026
Tonnage waiting	23,000	12,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	861	1,114
Tons on hand	58,950	73,600
Tons dumped for week	106,808	64,516
Tonnage waiting	.....	2,576
C. & O. Piers, Newport News:		
Cars on hand	948	1,228
Tons on hand	48,325	64,012
Tons dumped for week	86,219	65,849
Tonnage waiting	575	.....

Pier and Bunker Prices, Gross Tons

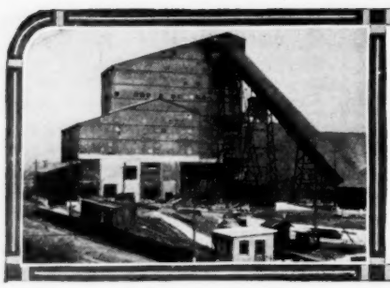
	April 19	April 26†
PIERS		
Pool 9, New York	$4.65@$4.90	**$4.75@$5.00**
Pool 10, New York	4.40@ 4.75	4.40@ 4.75
Pool 11, New York	4.25@ 4.50	4.25@ 4.50
Pool 9, Philadelphia	4.80@ 5.20	*4.70@ 5.05*
Pool 10, Philadelphia	4.55@ 4.90	*4.45@ 4.80*
Pool 11, Philadelphia	4.35@ 4.65	*4.30@ 4.55*
Pool 1, Hamp. Roads	4.35@ 4.45	**4.35@ 4.60**
Pool 2, Hamp. Roads	4.15@ 4.25	**5.15@ 4.30**
Pools 5-6-7 Hamp. Rds.	4.00@ 4.15	4.00@ 4.15
BUNKERS		
Pool 9, New York	4.95@ 5.20	**5.05@ 5.30**
Pool 10, New York	4.70@ 5.05	4.70@ 5.05
Pool 11, New York	4.55@ 4.80	4.55@ 4.80
Pool 9, Philadelphia	5.10@ 5.55	*5.00@ 5.40*
Pool 10, Philadelphia	4.90@ 5.20	*4.75@ 5.00*
Pool 11, Philadelphia	4.65@ 5.00	*4.50@ 4.80*
Pool 1, Hamp. Roads	4.45	**4.35@ 4.60**
Pool 2, Hamp. Roads	4.25	*4.15@ 4.30*
Pools 5-6-7 Hamp. Rds.	4.00@ 4.15	4.15

Current Quotations British Coal f.o.b. Port, Gross Tons

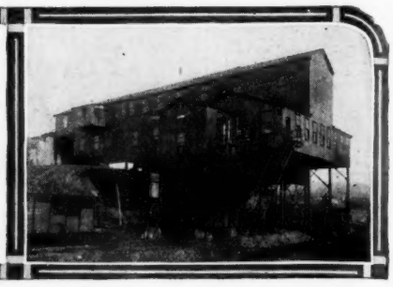
Quotations by Cable to *Coal Age*

Cardiff:	April 19	April 26†
Admiralty, large	30s.@31s.	*29s.@30s.*
Steam smalls	23s.6d.	*21s.*
Newcastle:		
Best steams	27s.@27s.6d.	*25s.6d.@27s.6d.*
Best gas	25s.6d.	*25s.@25s.6d.*
Best bunkers	25s.	*24s.6d.@25s.*

† Advances over previous week shown in **heavy type** declines in *italics*.



News Items From Field and Trade



ALABAMA

A. A. Fendley has been elected president and Ed. H. Rauwald secretary of the **Blount County Mining Co.**, of Oneonta, which was recently incorporated and has 300 acres of coal land under development.

ARKANSAS

Production of coal in the mines at Branch during the week of April 12 was the **highest of any week** since the local field was opened. A total of 886 narrow-gage cars was loaded into 72 standard gage cars. The record shows that 1923 was the best year for Branch since the railroad was built, the shipments totaling 1731 standard cars of coal.

COLORADO

The Cliente Coal Co. has been incorporated in Walesburg, with a capital stock of $50,000, by R. L. Snodgrass, S. M. Thompson and G. McNally.

During the month of March Colorado produced 894,262 tons of coal. This was an increase of 17,724 tons as compared with the same month last year. A total of 12,044 men was employed in and about the mines.

ILLINOIS

An official of the Union Colliery Co., of St. Louis, Mo., states that **but one man suffered a broken leg in the falling cage accident at the Kathleen mine** of that company April 10 at Dowell. A number of men were given attention at the Marshall Browning Hospital at DuQuoin, but the broken leg was the most serious injury.

The Pike County Collieries Co., 1141 North Vermilion Street, Danville, has been incorporated with capital of $62,500 to own, lease and operate coal mines. The incorporators are H. C. Adams, Thomas J. Hawkins and Charles F. Shannon.

Holly Stover, Inc., the Stover Coal Co., the Stover Elkhorn Coal Co. and the Star Coal & Coke Co. have removed their offices from the McCormick Building to suites 910-912, Straus Building, 310 South Michigan Ave., Chicago.

A number of **important improvements are soon to be made at Zeigler No. 1 and Zeigler No. 2 mines**, in Franklin County, of the Bell & Zoller Coal Co., of Chicago. At old No. 1 mine three steel stacks, one of which blew down early in April, and four boilers, all of which were nearly twenty years old, are to be replaced. A big concrete stack is to replace the steel ones. The main shaft will be retimbered. At No. 2 mine a crusher is to be installed and a new docking table for egg coal with conveyors to and from it are to be bought. This will necessitate an addition to the steel tipple.

INDIANA

All bids for providing the state's coal for next year have been rejected by the Indiana State Purchasing Committee. Fred B. Robinson, secretary of the committee, said the committee regarded the prices as excessive. The committee will ask for new bids at once. It is expected that the new proposals will be opened some time late in May. The lowest bid submitted for mine run coal, Fourth Vein, was $2, while Fourth Vein strip coal was bid at $1.98. Bids on Fifth Vein coal ranged from $1.75 to $2.25 for mine run. A number of bids submitted for eastern Kentucky, West Virginia and Illinois coal were not given serious consideration because of prohibitive freight rates.

The Otter Creek Coal Co., of Brazil, has been petitioned into bankruptcy by the First National Bank, Kattman & Tillet, and the Citizens Telephone Co., all of Brazil. The petition says the indebtedness totals $16,975.

KANSAS

The Kansas first-aid and mine-rescue meet, which was to have been held in Arma, May 17, **has been postponed** because mine idleness has taken so many men out of the field. If a contract for the Southwest is made soon enough to permit training, the state meet will be held a short time before the national meet at Huntington, W. Va., in September.

Ouster proceedings against Leon Besson, state mine inspector of Kansas, were instituted in the state Supreme Court April 21 by Attorney General C. B. Griffith. The Attorney General contends Besson is not qualified for the position because he has not complied with the state law requiring the state mine inspector to pass an examination before the state mining examining board.

KENTUCKY

John C. Smith, superintendent of the **Black Mountain Mining Co.**, of Harlan, on April 16 **denied reports** carried in the press to the effect **that the company was planning to start up its mines non-union**, as a result of a walkout of 500 men on April 1, when a reduction in wages was refused by the workers. Press reports were to the effect that trouble was brewing, and that troops would be in readiness. Smith replied to this by stating that the company had no intention of running unless it came to some sort of an agreement with the union.

Through the efforts of coal interests, headed by a western Kentucky coal operator in the last session of the Legislature, a bill was enacted whereby an armory commission was created, which is now obtaining armory connections for state troops in various sections of the field. This will result in more numerous enlistments, greater interest and better drilled troops, which will have more equipment and know how to use it. It will also mean troops available for labor and other disturbances on short notice. Contracts for housing have been completed at Carlisle, Covington, Winchester, Williamsburg, Poorfork, and are pending at Barbourville, Harlan and London, while arrangements will be made at Whitesburg, Hazard, Jackson, Beattyville, Booneville, Richmond, Monticello, Springfield, Hopkinsville, Mayfield, Bowling Green, Russellville and Livermore, which will give better protection in a number of isolated districts.

On April 18 Judge John L. Srout, referee in bankruptcy at Bowling Green, named M. M. Ennis, of Bowling Green, as receiver for the Drakesboro Coal Co., of Drakesboro, which had previously filed a voluntary petition in bankruptcy in the Western District U. S. Court, at Louisville, listing assets of $11,080 and liabilities of $13,105.07. Assets include a twenty-three year lease on 300 acres of coal land, with free use of rail connection to the Louisville & Nashville R.R., tipple, mine equipment, etc. Ennis will serve pending election of a trustee, after a settlement with the striking coal miners of Western Kentucky.

It is reported from Middlesboro that **mines in that section are operating on the 1917 scale or below**, and that the Southern Railway Co. has increased coal purchases by 40 per cent, which is resulting in about two days a week added to running time over a dull period.

It was reported from Harlan on April 18 that J. O. Carey, superintendent of the Intermountain Coal & Lumber Co., at Putney, was instantly killed by a sawlog when a log train on which he was riding was wrecked.

The Hombre Coal Co., at Coolidge, in Perry County, has been purchased by Henry Dabb and coal interests of Norton, Va., resulting in changing of the name of the company to the Coolidge Coal Co., with main offices at Norton.

NEW YORK

The Virginia Iron, Coal & Coke Co., reports for the quarter ended March 31, 1924, a net income of $5,792 after charges, against $75,371 in the previous quarter and $243,559 in the first quarter of 1923. The net income of $5,792 for the first quarter of 1924 is equal to 11c. a share on the $5,000,000 preferred stock against $75,371, or 12c. a share, on $10,000,000 in common for the previous quarter and net income of $243,559, or $1.81 a share, on common in the first quarter of 1923.

The Board of Directors of the **Pennsylvania Coal & Coke Corporation** on April 22 declared the regular dividend of $1 per share of the accumulated earnings and surplus of the company, payable on May 10, 1924, to stockholders of record at the close of business on May 5, 1924. The company reports for the month of March a deficit of $11,774 after ordinary taxes, depreciation and depletion and other charges, but before federal taxes. This compares with a surplus of $122,444 reported for the corresponding month of 1923. For the first quarter of this year the surplus was $1,001, against $394,217 in the first quarter of 1923.

OHIO

Representatives of some fifty mines in the Kanawha fields of West Virginia met at the Sinton Hotel in Cincinnati on April 24 at the call of D. C. Kennedy, secretary of the Kanawha Operators Association, to consider the juggling of freight rates by the Interstate Commerce Commission at the behest of union operators to the north of the Ohio River. Efforts have been made in Washington to raise the West Virginia and Kentucky lake and rail rates and lower those from the Ohio mines. Determined opposition to such a plan was voiced by those present and legal as well as association represention before the commission was authorized. No further action was taken regarding the shutdown of the Kanawha mines, which would indicate that the operators intend to sit still on this question until some definite move urges them to action.

Papers have been filed with the Secretary of State, authorizing the increase in capital stock of the **Doanville Coal Co.**, of Nelsonville, from $10,000 to $30,000. A. D. Knight is president and George E. Johnson, secretary.

Sunday Creek Mine No. 21, located in the Sugar Creek field, has been closed until market conditions improve, throwing out of employment about 600 miners

The 1,500,000-ton contract of the New York Central Lines, including all of the western divisions of that system, is attracting considerable attention among Columbus producers and distributors. While all of the contract has not been closed it is reported that the George M. Jones Co. received 600,000 and the Sunday Creek Coal Co. 400,000 tons. The price was $2 for mine run. Others are bidding on the tonnage, but the official award will not be made for a week.

Charles J. Albasin, commissioner of the Pittsburgh Vein Operators' Association, reports that **64 mines in the eastern Ohio field have been closed down** because of lack of demand, between 7,000 and 8,000 miners having been thrown out of employment as a result. A portion of the miners are working part time, however. Production in the district is at the lowest point in years, according to reports received from all sections of the producing field.

G. C. Weitzell, president of the New Pittsburgh Coal Co., Columbus, a subsidiary of the Pittsburgh Coal Co., has returned from a three months' vacation trip spent in California and the Hawaiian Islands.

Sealed proposals will be received May 9 by the Board of Education of Columbus for 7,000 tons, more or less, of bituminous run of mine; 8,000 tons, more or less, bituminous lump; 2,000 tons, more or less bituminous nut, pea and slack, to be delivered to the various schools.

Sealed proposals were received April 16 by the City Board of Purchase of Columbus and contract awarded to the Sunday Creek Coal Co. on a bid of $1.45 f.o.b. mines for coal as follows: 5,000 tons of Hocking nut, pea and slack for the Municipal Light plant; 3,500 tons Hocking nut, pea and slack for the Water Works Department and 2,000 tons Hocking nut, pea and slack for the Garbage Disposal Plant.

The Cedar Heights Clay & Coal Co., Oak Hill, has been chartered with a capital of $25,000 to mine and sell coal. Incorporators are James G. Morgan, Margaret J. Morgan, Anna Marie Kern, Roscoe Kern, Effie C. Howell and Alonzo E. Howell.

PENNSYLVANIA

The H. C. Frick Coke Co. has closed down ten plants in the Connellsville district and most of the others are running four or five days per week. The Oliver & Snyder Steel Co. coke plants are operating about 20 per cent. The Monessen Coal & Coke Co., a subsidiary of the Pittsburgh Steel Co., is operating about 50 per cent. The Buckeye Coal Co., a subsidiary of the Youngstown Sheet & Tube Co., has closed down its Brier Hill coal plant, and during the shutdown is changing from its steam plant to power purchased from the West Penn Power Co. The Republic Iron & Steel coal and coke operations are operating about 40 per cent. The Hillman Coal & Coke Co. is operating about 60 per cent. W. J. Rainey, Inc., continue to operate about full time.

Conferences with mine inspectors and colliery superintendents upon the subject of safety are to be conducted throughout the summer by Joseph J. Walsh, Secretary of Mines.

The monthly accident report of the Bureau of Workmen's Compensation of the State Department of Labor and Industry shows that during March there were **94 fatal accidents in coal mines** of the state.

J. M. Sloan, secretary of the Anthracite Forest Protective Association, and fire wardens in the Hazleton district have been kept busy with a series of forest fires. Collieries and coal banks in several sections were menaced. A large gang of men extinguished a raging fire near Grape Run, which was rapidly approaching the refuse and coal banks at the Spring Mountain operations of the Lehigh Valley Coal Co. Brush fires to the east and south of Eckley were numerous. Several occurred near Highland. A serious fire burned at Evergreen Valley for several days.

Indications that the strike at the Lehigh Valley Coal & Navigation Co. in the Panther Creek Valley will complete its third week were manifest when Thomas Kennedy, district president of the United Mine Workers, announced that suggestions for a settlement by J. B. Warriner, general manager of the company, had been rejected. Several conferences were held between officials of the union and company heads.

An active campaign waged by United Mine Workers officials of District No. 1 for David Fowler for the Republican nomination for Congressman for Lackawanna County was unsuccessful. With every district heard from Fowler lost to Laurence H. Watres by nearly 5,000 votes. Fowler obtained the Democratic nomination, but being a Republican since he entered politics, little hope is held out for favorable support from the Democratic party leaders. Mr. Fowler is an international organizer of the United Mine Workers.

On April 21 Judge Thompson, of the U. S. District Court at Philadelphia, appointed William O'Malley temporary receiver for the White Ash Coal Co., Minersville, and for the Marshfield Coal Co., of Tremont. Bills in equity were filed by Thomas F. O'Malley, a creditor of both companies. The two companies are owned and managed by the same interests. June 18 was fixed by the court for a hearing to make the receivership permanent.

Thomas Elliott, of South Brownsville, president of the Lilly Coal & Coke Co., of West Brownsville, Pa., returned home last week from a trip of several months to Europe for rest and recreation.

The Oak Hill coal breaker and separating plant of the Pine Hill Coal Co., Minersville, was **destroyed by fire** recently, causing a loss of about $100,000, including equipment.

Stream pollution due to wastes from coke-oven plants in the western part of Pennsylvania **has virtually disappeared,** according to Dr. Charles H. Miner, Secretary of Health and a member of the State Sanitary Waters Board. All of the large coke plants have installed apparatus, at the suggestion of the State Health Department, to arrest the flow of trade wastes into the Ohio,

Allegheny and Monongahela rivers. "As a result of this action upon the part of the large coke manufacturers in the western part of the state," said Dr. Miner, "Pennsylvania is far ahead of both West Virginia and Ohio in the matter of elimination of trade wastes from the waters of the state." The states of Ohio, West Virginia and New York are now endeavoring to co-operate with Pennsylvania in the drafting of a program for uniform anti-pollution regulations on interstate streams, such as the Ohio and the Delaware rivers.

VIRGINIA

At a meeting of the board of directors of the Pocahontas Coal & Coke Co. held April 22 **A. C. Needles was elected president** of the company, effective May 1, 1924, in succession to N. D. Maher, retired.

WEST VIRGINIA

In future trials of those implicated in the Logan "armed march" cases of 1921, **the state will be represented by Harold A. Ritz**, just designated by Governor Morgan to serve in that capacity. In the cases already tried, counsel for the defense have always laid stress on the charge that the state was not represented in the prosecution but that outside attorneys were employed by members of coal operators' associations. Judge Ritz formerly was on the West Virginia Supreme Court bench, retiring a year or so ago to engage in private practice in Charleston.

The Maryland-New River Coal Co., of Philadelphia, has a newly completed tipple, erected at a cost of $100,000, at its mines on Keeney Creek. It is one of the largest in the New River field, its equipment including screening facilities, loading boom, etc. The new structure is of wood and will take the place of two old tipples at the Rothwell Smokeless mines, the output of both workings being dumped over the new Tipple. The saving in labor costs, it is estimated, will amount to $100 per day.

The Buffalo Valley Collieries Co. has just been launched with a view to operating in the Brooke County section of the northern Panhandle of West Virginia; capital, $150,000; headquarters, Wellsburg. Chiefly interested in the new concern are Daniel Reamer, Fred Cooper, George S. Shrader, John S. Duvall, of Monessen, Pa., and W. W. Luce, of Vernon.

The Logan Eagle Collieries Co. has been authorized to change its form of capitalization from 5,000 shares of preferred stock at $100 and 20,000 shares of no par value stock to 7,500 shares of common stock of a par value of $100.

The Betty Ann Collieries Co., of Putnam, will soon install shaker screens in its mine at that place. Other improvements will be made to the property. The exclusive sales contract for the product of this company has been taken by the Wheeler Coal & Coke Co., of Columbus, Ohio. William Jones is manager of the Betty Ann Collieries Co.

A total of 3,424,144 net tons of smokeless coal was produced during February, as against 3,282,518 net tons during February, 1923. The Pocahontas field produced 1,637,925 net tons as against 983,625 tons in February, 1923. New River production amounted to 719,712 tons as against 551,513 tons in February, 1923. Winding Gulf produced 642,767 tons as against 471,060 tons in February, 1923. Tug River produced 423,740 tons, as against 276,320 tons in February, 1923. Of the total smokeless produced, the Norfulk & Western handled 2,061,665 tons, the Chesapeake & Ohio 753,025 tons and the Virginian 609,454. Total coal shipments in February by the Chesapeake & Ohio were 3,322,596 tons, as compared with 3,041,365 by the Norfolk & Western and 694,216 by the Virginian.

Only five new coal companies were organized in West Virginia in March, a much smaller number than usual, due in large measure to the depressed state of the coal market. The five companies organized—all resident—had an aggregate capitalization of $410,000. Included in the list were: Thomas & Wilson Coal Co., of Buckhannon, which will operate a lease on Cabin Creek, $50,000; Big Otter Collieries Co., of Wheeling, with a capital of $30,000; Banfi Coal Co., of Follansbee, with a capital stock of $25,000; Kentucky Coal & Land Co., of Wheeling, with a capital of $25,000; Nonsuch Pocahontas Coal Co., of Iaeger, with a capital stock of $10,000.

The Deaker Hill Coal Mining Co., operating near Kingwood, in Preston County, has been placed in the hands of a receiver on an order of the Circuit Court of Preston County. W. P. Walker of Akron, Ohio, and James W. Flynn, of Kingwood, were appointed receivers by Judge Hughes.

The Interstate Coal & Coke Co. has filed a certificate of dissolution. The Mack Coal Co. has changed its form of capitalization from $150,000 to 1,000 shares of preferred stock at $100 and to 1,500 shares of no par value.

The Wilbur Fuel Co. has increased its authorized capital stock from $500,000 to $1,000,000.

WASHINGTON, D. C.

The U. S. Supreme Court has granted a motion to advance the case of **Davis, Director General, vs. the Corona Coal Co.** Argument has been set for May 5. In this case the Director General of Railroads sued the coal company for damages to a wharf owned by a railroad under his jurisdiction at New Orleans when a tug of the coal company collided with it. The Louisiana courts held that the suit had not been brought within a year, which was the time limit for such actions under Louisiana law. The Director General appealed on the ground that he was not subject to the state law in such suits.

The Civil Service Commission announces examinations for junior engineers, to be held throughout the country May 9. The optional subjects include the following divisions of engineers: **Aeronautical, agricultural, ceramic, chemical, civil (general), electrical, electro-chemical, fisheries, hydraulic, materials, highway, industrial, irrigation and drainage, mechanical, mining, petroleum, radio and structural.** The Bureau of Mines will name several junior mining engineers and has one opening at present.

The Roslyn Coal & Coke Co., of Tacoma, has been incorporated by A. F. Plant and George H. Reed for $50,000.

CANADA

The British Columbia Electric Ry. has let contracts exceeding $400,000 for improvements to its gas plants at Vancouver and Victoria. Among the improvements to the Vancouver plant is a coke briquetting plant of a capacity of 25 tons per day.

Pattison & Bowns, Inc., of New York City, **has acquired an interest in the St. Lawrence Importing & Distributing Co., Ltd.**, of Canada. This company has been for some time past engaged in the sale of anthracite and bituminous coal in Canada, with offices in the Royal Bank Building, in Toronto, Ontario. George S. McSweeney, formerly connected with the Century Coal Co., of Montreal, has become affiliated with the St. Lawrence Company as general manager and will have his headquarters in Montreal. Pattison & Bowns, Inc., is a subsidiary of the United States Distributing Corporation.

More than 100,000 tons of coal has been contracted for in Newfoundland for delivery this summer from the Dominion Coal Co. Of this amount between 50,000 and 60,000 tons will be taken by the Newfoundland government to be used by its boats, railways and other services. The balance has been sold to local dealers at St. Johns.

Keen competition has set in at Montreal between the dealers handling Welsh and Scotch anthracite and those selling the American product. The price of **American anthracite has been reduced from $17 a ton to $15.25.** The price of coke has been lowered from $14 to $12.50 per ton due to competition from Nova Scotia coke.

W. Donaldson, lessee of the Donaldson-Tennant coal mine near Lethbridge, where a strike of miners is in progress, **has subleased his mine to the miners.** It is the first effort since the strike started, April 1, to operate any of the mines in the district. Officers of the United Mine Workers have ordered heavy picketing of the mine and proclaim the workers as strike breakers.

Practically all the United Mine Workers' locals in Pictou County, Nova Scotia, have passed strongly worded **resolution urging the government to increase the duty on American coal** to $2 per ton. Pictou County collieries are working only two to four days a week, and this probably will continue until after the opening of navigation. The local unions also urge on the Dominion Government a reduction in freight rates on the Canadian National Ry., so that Nova Scotia coal may enter the Quebec and Ontario markets.

Traffic News

Northwest Hard-Coal Rate Favors the Docks

The decision of the Interstate Commerce Commission on the matter of withdrawing the joint freight rate on hard coal all-rail from Buffalo to the Twin Cities was exceedingly quick. The decision was something of a compromise in that it refused to allow the rate to become the sum of the locals, and further agreed with the objectors that the long-haul rate need not be based upon the distance wholly. But two-thirds of the proposed increase of $1.66 was allowed, or $1.16, which will become effective with the filing of new tariffs and the customary period of notice. This will mean, unless there is some further interference, that the all-rail rate will be increased by $1.16 about May 29. Under the old rates, all-rail hard coal had an advantage over the laid-down dock coal price of about 35c. The increase will give a handicap of 81c.

The dock concerns insist that the change will make no difference in their prices. The independent retail concerns which fought the new rates insist that it gives the dock trade a practical monopoly of the hard-coal business, as the handicap forces the independents to buy from them and also prevents bringing all-rail coal through in an emergency. They predict that it is only a matter of time when the dock price will be increased by $1.16, as a result of doing away with the all-rail competition.

Dismiss Complaint Against Pennsy

The complaint of the Lackawanna Steel Company against coal and ore rates from points in Pennsylvania to Buffalo, N. Y., was dismissed April 25 by the Interstate Commerce Commission. The complaint was filed against the Pennsylvania R.R. and charged that rates on coal and coke from Reynoldsville, Pittsburgh and Connellsville, Pa., to iron and steel manufacturers at Buffalo were unreasonable and that rates on ores shipped from lower Lake Erie ports to competing interior iron and steel manufacturers were unreasonably low.

Two Roads Pay; One Escapes

In the case of the Midland Coal Co. against the Midland Valley R.R., the Interstate Commerce Commission has been called upon to prorate the amount of reparation due the coal company on certain shipments from Williams, Okla., to Kansas City. The coal moved over the Midland Valley, the Missouri, Oklahoma & Gulf and the Frisco. In a previous decision the commission awarded reparation with interest against the three carriers. The Missouri, Oklahoma & Gulf was sold under foreclosure. The purchaser, the Kansas, Oklahoma & Gulf, bought the line with the condition that all claims against the property must be presented within ninety days after the sale. As the amount of reparations owed by the one carrier could not be collected, the examiner has found the amounts chargeable to the two other carriers and recommends that they be instructed to make such payments to the coal company.

Finds Indiana Rates Reasonable

Rates on bituminous coal in carloads from the Brazil-Clinton and Linton-Sullivan mine groups in Indiana to various Indiana points are not unreasonable, in the opinion of Interstate Commerce Commission Examiner Carter. In his report to the commission he recommends that the complaint against these rates be dismissed. The complaint was filed by a number of retail coal dealers in Indiana.

Coming Meetings

Chamber of Commerce of the United States. Twelfth annual meeting at Cleveland, Ohio, May 6-8. Secretary, D. A. Skinner, Mills Bldg., Washington, D. C.

National Exposition of Coal Mining Equipment and Machinery of the American Mining Congress, May 12-17, Cincinnati, in conjunction with the annual meeting of the National Coal Association.

West Virginia Coal Association. Annual meeting May 13-17, Cincinnati, Ohio. Secretary, W. H. Cunningham, First National Bank Building, Huntington, W. Va.

National Coal Association. Annual meeting, May 14-16, Cincinnati, Ohio. Executive Secretary, H. L. Gandy, Southern Building, Washington, D. C.

Mine Inspectors Institute of America. Annual meeeting, Sinton Hotel, Cincinnati, Ohio, May 14-16. Secreetary, Martin Bolt, State House, Springfield.

Retail Coal Dealers Association of Texas. Nineteenth annual convention, May 20 and 21, Vernon, Texas. Secretary, C. R. Goldman, Dallas, Texas.

Pennsylvania Retail Coal Merchants Association. Twentieth annual meeting and exposition, Commercial Museum, 34th and Spruce Sts., Philadelphia, Pa., May 22-23. Secretary, W. M. Bertolet, Reading, Pa.

International Railway Fuel Association. Sixteenth annual convention, May 26-29. Chicago, Ill. Secretary-Treasurer, J. B. Hutchinson, 600 Michigan Ave., Chicago, Ill.

The American Society of Mechanical Engineers. Spring meeting May 26-29, Cleveland, Ohio. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Wholesale Coal Association. Annual convention, White Sulphur Springs, W. Va., June 3-4. Secretary, G. H. Merryweather, Chicago Temple Bldg., Chicago, Ill.

West Virginia Coal Mining Institute. Annual meeting June 3 and 4, Elkins, W. Va. Secretary, R. E. Sherwood, Box 1026, Charleston, W. Va.

The National Foreign Trade Convention. June 4-6, Boston, Mass. Secretary, O. K. Davis, 1 Hanover Square, New York City.

National Retail Coal Merchants' Association. Annual meeting, Hotel Virginian, Bluefield, W. Va., June 4-6. Secretary, Walter D. Rogers, Transportation Building, Washington, D. C.

Southwestern Interstate Coal Operators Association. Annual meeting June 10, Kansas City, Mo. General Commissioner, W. L. A. Johnson, Keith & Perry Bldg., Kansas City, Mo.

Illinois & Wisconsin Retail Coal Dealers Association. Annual meeting, June 10-12, Delavan, Wis. Secretary, I. L. Runyan, Great Northern Bldg., Chicago, Ill.

Illinois Mining Institute. Annual meeting, June 12-14 from St. Louis via boat down the river. Secretary, Martin Bolt, Springfield, Ill.

American Society for Testing Materials. Annual meeting, Chalfonte Hotel, Atlantic City, N. J., June 23-27. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

New Equipment

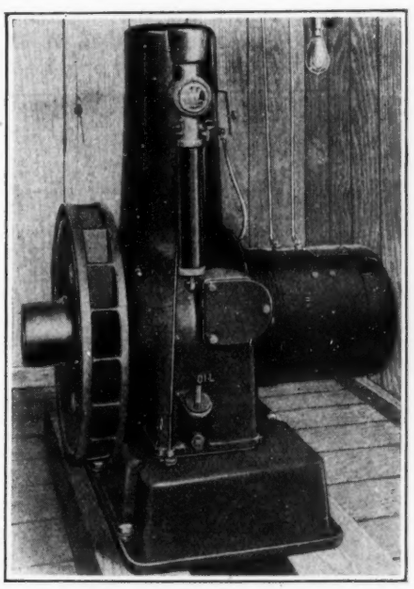
Small Light-and-Power Plant

A small kerosene or natural-gas light-and-power plant for use without a battery has been developed by the Westinghouse Electric & Manufacturing Co. for service wherever the current can be turned directly into the line. The absence of the battery adds greatly to the ruggedness and portability of the plant, and it is particularly well suited for direct service or for auxiliary or standby service to supplement existing generating equipment in such places as mines and quarries, construction camps, pumping stations, barges, boats and dredges.

The plant has a capacity of 1,500 watts at 110 volts. It consists of a gasoline engine and an electric generator built into a single compact unit. The engine is air-cooled, which makes it possible to install it in unheated places, economical in oil and fuel consumption, ruggedly constructed, and operates at a slow speed. It has a capacity of sixty 25-watt lamps or about 1½ hp.

A distinctive feature of the plant is the ease with which it can be operated. There are no complicated adjustments or operations necessary to start or stop it, and no other attention is necessary while it is running except to keep the fuel and oil tanks supplied. The single-cylinder, four-cycle engine has a 3⅜-in. bore and 5-in. stroke. A fan in the flywheel draws air into the cylinder dome and over the cylinder fins, assuring cool operation under all conditions.

The engine is lubricated by a splash-feed system which supplies the proper



Small Generating Unit Which Requires No Battery

The engine operates on kerosene or natural gas. Fuel is supplied by a Venturi mixing valve. The generator will supply energy to a 1½-hp. load.

quantity of oil to the moving parts at all times regardless of the depth in the crankcase. This is accomplished by an oil-carrying gear that dips into the oil in the crankcase and carries it to a pan keeping the oil in this pan at a constant level. A simple Venturi mixing valve is used instead of the usual complicated carburetor. Fuel is drawn by suction to this valve from the 6-gal. tank built into the base of the unit. A simple mechanical governor controls the speed of the engine by regulating both the fuel and the air. The complete unit conforms to the requirements of the Fire Underwriters.

Vibration Prevents Screen From Gumming

A vibrating screen designed to separate fine particles of byproducts, coke, coal and limestone has recently been placed on the market by the Link-Belt Co., Chicago, Ill. Provision has been made to provide uniform vibration over the entire screening box. The screen is vibrated by the action of an unbalanced pulley which is supported on the screening frame and rotated at high speed. The unbalanced pulley may be adjusted to impart to the main screen box rapid vibrations of the proper intensity and direction to screen many different kinds of materials. The pulley is provided with a bushing and is lubricated automatically under forced-feed. The screen box is arranged for one, two, or three screen decks, depending upon whether two, three, or four sizes of material are to be produced. The screen cloth is mounted on a movable frame carried within the box, each provided with means for stretching the cloth. The box is clamped rigidly to the hollow stationary shaft carrying the vibrator pulley. The vibrations are imparted directly to the box and screen cloth.

The screen box with feed hopper and discharge chute is suspended from two hollow cross shafts, the ends of which are carried on flat spiral springs on the supporting structure.

Arcwall Coal-Cutting Machine Approved

The latest addition to the list of permissible coal cutting machines, approved by the U. S. Bureau of Mines, is a Jeffrey direct-current arcwall coal-cutting machine. Two approvals were issued by the Bureau covering the 250-volt and 500-volt design.

The complete machine consists of a self-propelled truck having a turret mounted on its front end which carries the cutter bar and the motor driving the cutter chain. The motor which drives the cutter chain also supplies power for turning the turret.

A second motor having a controller and resistance serves to propel the truck and raise and lower the turret. The cable reel, fuse and switch compartment are mounted on the rear of the truck. If desired, a headlight mounted on the turret, is furnished, but only on a 250-volt machine. The wiring between compartments is run in flexible armored conduit, except that to the turret which is run in armored hose.

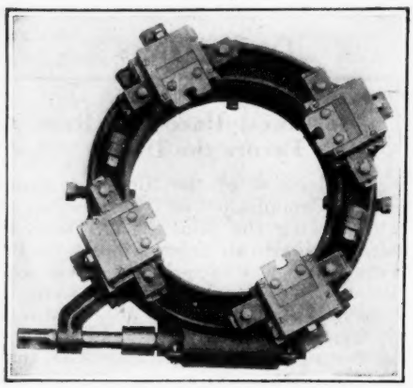
The various compartments containing electrical parts were tested in explosive mixtures of Pittsburgh natural gas and air, and all passed successfully the required examination.

Square-End Pipe Cutters

Three new cutters, suitable for use on pipes ranging in size from 2½ in. to 12 in. have just been placed on the market by the Borden Co., of Warren, Ohio, manufacturers of the Beaver pipe cutters and dies. Though the same knife construction and automatic feed used on smaller sized cutters are provided on these latest types, the driving pinion remains stationary, rotating the cutting knives by means of an inclosed worm gear.

The adjustment to various sized pipes is made quickly—the same knives cut all sizes—and as no feeding is required while cutting, the tool works rapidly. It is claimed that the knives and other parts will not break. These new cutters may be operated in any position on the pipe, either by hand or mechanical power.

The cutters are made of high-speed steel and malleable iron. The device is easily portable and readily placed on pipes of greatly varying size.

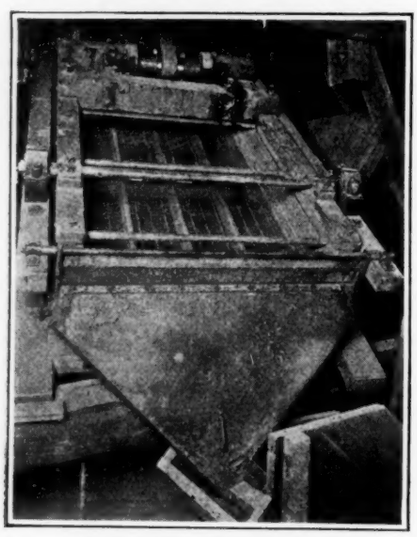


Cutters for Large Pipes

It is easy to cut almost any size pipe with this new cutter. The ratchet handle permits the use of the cutter in the most confined places.

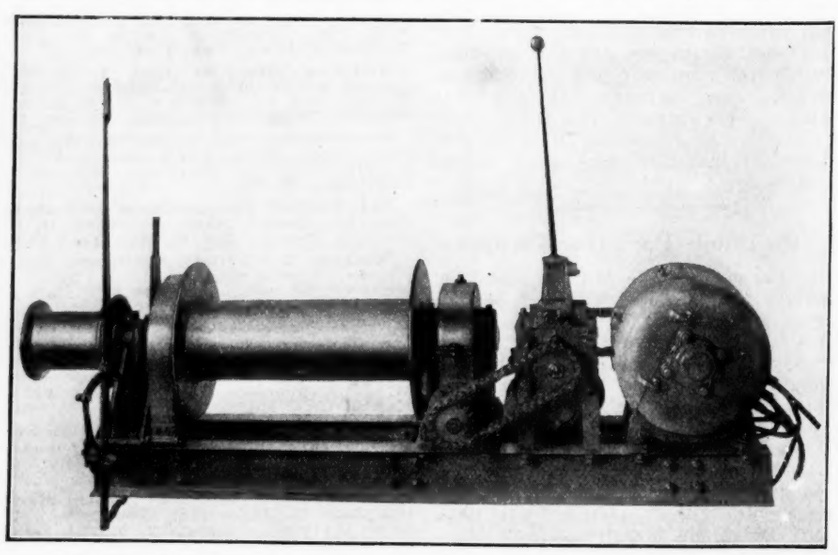
Four-Speed Hoist

Here is a hoist with a four-speed gear reduction particularly suitable for very long hauls on steep inclines. It is provided with a long, wide drum equipped with deep flanges. The speed reductions are accomplished by means of a transmission gear unit very similar to that used on automobiles. The design of the hoist is such that it can be operated from an alternating or direct-current constant speed motor. A large heavy brake suitable for holding any load up to the full capacity of the machine is provided on each hoist. The operation of the brake is made very efficient and yet easy by means of a long lever-type brake arm. The complete unit is the product of the Silent Hoist Co., of Brooklyn, N. Y., and is suitable for rope pulls up to 12,000 lb.



Screen Sifts Fine Materials

Vibrations are produced by the action of an unbalanced pulley rotated at high speed. It is claimed that all parts of the screen surface are uniformly vibrated.



Utility Hoist Specially Suitable for Locating Mine or Railroad Cars

Speed control can be obtained through a four-speed gear shift, thus this hoist may be used to move heavy loads at slow speeds, or light loads at high speeds. The whole unit is mounted on a common I-beam base and may easily be shifted about the mine yard for moving timber or cars.